# FOURTH FIVE-YEAR REVIEW REPORT FOR PORTLAND CEMENT SUPERFUND SITE SALT LAKE COUNTY, UTAH

**Prepared by**

**Utah Department of Environmental Quality**
**Division of Environmental Response and Remediation**

**For**

**U.S. Environmental Protection Agency**
**Region 8**
**Denver, Colorado**

Betsy Smidinger
**Assistant Regional Administrator**
**Office of Ecosystems Protection and Remediation**

9/26/17
**Date**

## Table of Contents

# LIST OF ABBREVIATIONS & ACRONYMS

| | |
|---|---|
| ACLs | Alternative Concentration Limits |
| ARAR | Applicable or Relevant and Appropriate Requirement |
| BRA | Baseline Risk Assessment |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | Code of Federal Regulations |
| Chromium 6 | Hexavalent Chromium |
| CKD | Cement Kiln Dust |
| COCs | Contaminants of Concern |
| EPA | United States Environmental Protection Agency |
| FYR | Five-Year Review |
| ICs | Institutional Controls |
| MCLs | Federal Maximum Contaminant Levels |
| mg/kg | milligrams/kilogram |
| MNA | Monitored Natural Attenuation |
| NA | Not Applicable |
| NCP | National Oil and Hazardous Substances Pollution Contingency Plan |
| NPL | National Priorities List |
| O&M | Operation and Maintenance |
| OU | Operable Unit |
| OU1 | Operable Unit One |
| OU2 | Operable Unit Two |
| OU3 | Operable Unit Three |
| POC | Point of Compliance |
| PRP | Potentially Responsible Party |
| RAO | Remedial Action Objectives |
| ROD | Record of Decision |
| RPM | Remedial Project Manager |
| Site | Portland Cement Superfund Site |
| Surplus Canal | Jordan River Surplus Canal |
| TBC | To be considered |
| TCLP | Toxicity Characteristic Leachate Procedure |
| UDEQ | Utah Department of Environmental Quality |
| UDEQ-DERR | Utah Department of Environmental Quality, Division of Environmental Response and Remediation |
| UU/UE | Unrestricted Use/Unlimited Exposure |
| µg/L | micrograms/Liter |

# I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The Utah Department of Environmental Quality, Division of Environmental Response and Remediation (UDEQ) has been tasked by the U.S. Environmental Protection Agency (EPA) to prepare this five-year review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fourth FYR for the Portland Cement Superfund Site (Site). The triggering action for this statutory review is the previous FYR completed on September 26, 2012. This FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of three OUs and all three are addressed in this FYR.

- Operable Unit 1 (OU1) addressed Cement Kiln Dust (CKD) at the Site.
- Operable Unit 2 (OU2) addressed chromium bearing bricks and contaminated soils.
- Operable Unit 3 (OU3) addressed contaminated groundwater.

This FYR was led by Thomas Daniels, UDEQ Environmental Engineer. Participants included Dave Allison, UDEQ Community Involvement Coordinator, and Melissa Ottley, UDEQ Environmental Scientist. The review began on 5/10/2017.

**Site Background**

The Site is located in Salt Lake City, Utah on the west side of Redwood Road (1700 west) at 1000 south, within a triangular area defined by Indiana Avenue, Redwood Road and the Jordan River overflow canal (Surplus Canal) (Figure 1- Site Location). The approximately 70-acre site consists of three separate but adjacent properties known as the West Site (approximately 35 acres), Site 2 (approximately 17 acres), and Site 3 (approximately 19 acres) (Figure 2 – Site Map). All figures are at the end of this report

The risks posed by the Site were derived from Cement Kiln Dust (CKD) and chromium-bearing bricks which were deposited within the Site boundaries. The CKD contained several metals including arsenic, cadmium, chromium, lead, manganese, and molybdenum. These metals were present in both surface soils and groundwater at the Site at concentrations potentially harmful to human health. Risks were also posed by the highly alkaline nature of the CKD.

The land use to the northwest and south of the Site is commercial and light industrial. Residential areas exist east of the Site and include single family dwellings, mobile home parks and some high density multi-family residential units. The population within a one-mile radius is estimated between 8,000 and 14,000. A new road, utilities, and several businesses have been constructed at the Site since the 2012 FYR. A high capacity underground sanitary sewer pipe with above ground manholes traverses the Site from north to south was upgraded since the 2012 FYR.

The CKD and contaminated surface soil were removed during remedial actions completed in 1997. The Site was backfilled with clean soil and regraded. Significant levels of contaminants still remain in groundwater in the shallow aquifer that lies beneath the Site.

## FIVE-YEAR REVIEW SUMMARY FORM

| SITE IDENTIFICATION | | |
|---|---|---|
| **Site Name:** Portland Cement Superfund Site | | |
| **EPA ID:** UTD980718670 | | |
| **Region:** 8 | **State:** UT | **City/County:** Salt Lake City/ Salt Lake County |

| SITE STATUS | |
|---|---|
| **NPL Status:** Deleted | |
| **Multiple OUs?** Yes | **Has the site achieved construction completion?** Yes |

| REVIEW STATUS |
|---|
| **Lead agency:** State<br>***[If "Other Federal Agency", enter Agency name]*:** |
| **Author name (Federal or State Project Manager):** Thomas Daniels |
| **Author affiliation:** UDEQ/DERR |
| **Review period:** 5/1/2017 – 8/25/2017 |
| **Date of site inspection:** 7/19/2017 |
| **Type of review:** Statutory |
| **Review number:** 4 |
| **Triggering action date:** 9/30/2012 |
| **Due date *(five years after triggering action date)*:** 9/30/2017 |

# II. RESPONSE ACTION SUMMARY

All of the CKD deposited at the Site was produced by the Portland Cement Company plant located at 619 West 700 South in Salt Lake City, Utah. Sites 2 and 3 were proposed for inclusion on the National Priorities List (NPL) in 1985. The Site and West Site were formally listed on the NPL in June 1986.

## Basis for Taking Action

The waste CKD and the chrome bearing bricks disposed at the Site contaminated the underlying soil and groundwater. A Baseline Risk Assessment (BRA) based on sampling results from the Remedial Investigation (RI) identified the following contaminants of concern (COCs): arsenic, cadmium, chromium, hexavalent chromium (chromium 6) lead and molybdenum in site soils. Chrome-bearing refractory bricks and highly alkaline soils were also identified as potential health concerns.

The BRA determined that conditions at the Site posed a risk to human health and the environment. Specifically, the COCs that had been released in surface and subsurface soils and groundwater pose a risk through direct contact, ingestion and inhalation. In addition, the high alkalinity of the CKD had impacted groundwater resulting in elevated pH, a water quality indicator.

## Response Actions

The Site has been divided into three Operable Units (OUs)

- Operable Unit One (OU1), addressed CKD deposited at the Site.
- Operable Unit Two (OU2), addressed chromium-bearing bricks and contaminated on-site soils.
- Operable Unit Three (OU3), addressed contaminated groundwater.

A Record of Decision (ROD) for OU1 was signed on July 19, 1990. The selected remedy proposed to address CKD and chromium-bearing refractory kiln brick and dispose of it in the Salt Lake Valley Landfill. The OU1 ROD did not list Remedial Action Objectives (RAOs).

The remedy components listed in the OU1 ROD are:

- Excavation and off-site disposal of CKD in a UDEQ and EPA approved, non-commercial, double-lined, industrial land fill.
- Separation of chromium-bearing refractory kiln brick from the waste CKD and temporary storage of the kiln brick at an acceptable on-site location for treatment and off-site disposal under OU2.
- Initiation of groundwater monitoring.

A ROD for OU2 was signed on March 31, 1992. The selected remedy proposed to remove and treat additional contaminated soil and chromium bearing bricks. The OU2 ROD did not list RAOs.

The OU2 ROD identified six COCs and developed action levels for two of them:

**Table I: Contaminants of Concern**

| Contaminant | Action Level (mg/kg) |
|---|---|
| Arsenic | 70 |
| Lead | 500 |
| Cadmium | NA |
| Chromium 3 | NA |
| Chromium 6 | NA |
| Molybdenum | NA |
| Notes:<br>Mg/kg = Milligrams per kilogram<br>NA = Not applicable | |

The remedy components listed in the OU2 ROD are:

- Excavation of all soils with lead concentrations greater than 500 mg/kg and/or arsenic concentrations greater than 70 mg/kg.
- Solidification of all excavated soils exceeding 5 mg/L lead as measured by TCLP analysis.
- Treatment of chromium-bearing bricks using chemical fixation followed by solidification.
- Disposal of treated bricks and soil at an off-site facility.
- Installation of a protective layer consisting of clean fill at least 18 inches thick over the Site.

An amended ROD signed in September 29, 1995 combined OU1 and OU2 and addressed contaminant sources at the Site including CKD and chromium-bearing brick. The amended ROD also addressed CKD-contaminated soil

underlying the CKD. The amended ROD did not list RAOs.

The remedy components listed in the amended ROD are:

- Removal and disposal of all CKD.
- Removal and off-site disposal of all soils with contaminant concentrations above action levels to a maximum depth of 24 inches.
- Removal, off-site treatment, and disposal of chromium-bearing bricks.
- Reuse of non-hazardous debris as Site fill material.
- Installation of a protective layer consisting of clean fill at least 18 inches thick.
- Institutional controls (ICs) for contaminated soil left in place at the Site.

A ROD for OU3 was signed in May 1998, and addressed residual metal groundwater contamination which occurred as a direct result of CKD that had been present at the Site. The remedy selected was monitored natural attenuation (MNA).

The OU3 ROD identified the following RAOs:

- Prevention of human exposure to Site groundwater that would result in excess cancer risk equal to or exceeding $1x10^{-6}$, or a hazard quotient exceeding one, for a reasonably maximally exposed individual.
- Prevention of off-site migration of contaminants to unprotected groundwater.
- Restoration of groundwater to its beneficial use to the extent practicable.
- Prevention of unacceptable impacts to surface water associated with the Site.

The OU3 ROD established cleanup levels for the shallow aquifer that would result in attainment of the RAOs listed above. The cleanup goals for each COC are shown below:

**Table II: Cleanup Goals for OU3 (Groundwater)**

| Contaminant | Cleanup Goal |
|---|---|
| Arsenic | 64.0 |
| Cadmium | 6.20 |
| Chromium | 100 |
| Lead | 15.0 |
| Manganese | 400 |
| Molybdenum | 182 |
| pH | <8.00 |

Because the shallow aquifer discharges into the sanitary sewer and the City Drain, and eventually discharges into the Farmington Bay Waterfowl Management Area of the Great Salt Lake, the OU3 ROD identified surface water performance standards based on 125% of Class 3D Aquatic Wildlife Water Quality standards. The City Drain, where it passes underneath Indiana Avenue, was identified as a Point of Compliance (POC) where the in-stream concentrations were not to exceed the performance standards as shown below:

**Table III: Surface Water POC Performance Standards**

| Analyte | Performance Standard (in µg/L) |
|---|---|
| pH | 8.13 - 11.3 |
| Aluminum | 181 |
| Arsenic | 188 |
| Cadmium | .31 |
| Chromium | 92.5 |
| Chromium 6 | 13.8 |
| Copper | 11.3 |
| Iron | 1,250 |
| Lead | 3.13 |
| Mercury | 0.01 |
| Nickel | 65.0 |
| Selenium | 5.75 |
| Silver | 2.00 |
| Zinc | 150 |

The OU3 ROD established alternate concentration limits (ACLs) for groundwater discharging into the City Drain to ensure that in-stream concentrations do not exceed the surface water performance standards. These ACLs were calculated by determining what concentrations of individual chemicals in groundwater would cause an exceedance of 125% of the Class IIID water standards for water oriented wildlife within the City Drain at the POC. The ACLs are shown below:

**Table IV: Alternate Concentration Limits**

| Analyte | ACL (in µg/L) |
|---|---|
| Aluminum | 4,500 |
| Arsenic | 9,830 |
| Cadmium | 140 |
| Chromium | 26,300 |
| Chromium 6 | 569 |
| Copper | 1,560 |
| Iron | 25,800 |
| Lead | 667 |
| Mercury | 0.620 |
| Manganese | NA |
| Molybdenum | NA |
| pH | NA |
| Nickel | 259 |
| Note: ACls are calculated to 3 significant figures<br>NA = Not applicable | |

The remedy components listed in the OU3 ROD are:

- Long-term groundwater and surface-water monitoring to ensure the efficacy of the remedy and protection of human health and the environment.
- ICs in the form of groundwater use restrictions.

## Status of Implementation

The Remedial Action (RA) for the Site was initiated in December 1995. Actual construction work began March 31, 1996 and RA activities were completed in November 1997. The scope included the following activities:

- Excavation of CKD from Sites 2 and 3.
- Excavation of CKD, debris and soil from West Site.
- Separation of chromium-bearing refractor brick from CKD in Sites 2 and 3.
- Transportation and off-site disposal of CKD.
- Transportation and off-site disposal of chromium-bearing refractory bricks.
- Backfilling, contouring and revegetation of Site.
- Installation of monitoring well network.

## IC Summary Table

**Table V: Summary of Planned and/or Implemented ICs**

| Media, engineered controls, and areas that do not support UU/UE based on current conditions | ICs Needed | ICs Called for in the Decision Documents | Impacted Parcel(s) | IC Objective | Title of IC Instrument Implemented and Date (or planned) |
|---|---|---|---|---|---|
| Subsurface soil and groundwater. | Yes | Yes | Site 2, Site 3, and the Portland West Site. | Land use easements have been placed on the properties that make up the Site. The easements function similarly to an environmental covenant and place restrictions on the use of groundwater until established cleanup goals are achieved. The easements also prohibit soil removal or excavation activities that might interfere with the implemented remedy and require approval of UDEQ prior to any work. | "Soils Restriction" easement, modified in 2007 and 2009 to facilitate development. |

## Systems Operations/Operation & Maintenance

### OU1

There are no operating systems associated with OU1 and Operation and Maintenance (O&M) is not required.

### OU2

There are no operating systems associated with OU2 and O&M is not required.

**OU3**

The OU3 ROD established MNA as the selected remedy to address the contaminated shallow aquifer. A network of groundwater monitoring wells was constructed at the Site to monitor concentrations of contaminants in the shallow and intermediate aquifers to ensure the effectiveness of the MNA remedy.

The O&M Plan originally called for quarterly monitoring until the groundwater cleanup goals are met; however the sampling events were changed to semi-annual monitoring in 2002. Initially, samples were collected from 16 monitoring wells and a surface water point to evaluate the effectiveness of the MNA remedy. Due to changes in ownership/construction activities associated with development, a number of the original wells have been damaged or removed and are no longer sampled. Currently, nine shallow aquifer monitoring wells and three intermediate aquifer monitoring wells are sampled to evaluate the effectiveness of the natural attenuation remedy. Monitoring of groundwater has taken place regularly since 1999.

Since 1999 nine monitoring wells have been either damaged or removed. Four shallow aquifer wells (B7S, PWDA, PWKA and P3BB) and five intermediate aquifer wells (B6I, B7I, PWT, PWU, and P2EA) are no longer being utilized. UDEQ is currently coordinating replacement and/or repair of monitoring wells P3BB, PWU, PWKA and P2EA with property owners. Replacement and/or repair of these damaged wells will bring the total number of wells monitored to eleven shallow aquifer wells and five intermediate aquifer wells.

Semi-annual sampling has taken place In June and November each year since the 2012 FYR. However reports for the November 2015, June 2016, and November 2016 events have not been submitted to EPA at this time.

# III. PROGRESS SINCE THE LAST REVIEW

This is the fourth FYR for the Site. The previous review was completed on September 26, 2012. This section includes the protectiveness determinations and statements from the last five-year review as well as the recommendations from the last five-year review and the current status of those recommendations.

**Table VI: Protectiveness Determinations/Statements from the 2012 FYR**

| OU # | Protectiveness Determination | Protectiveness Statement |
|---|---|---|
| 1 | Protective | The 2012 FYR did not list a Protectiveness Statement specific to OU1. |
| 2 | Protective | The 2012 FYR did not list a Protectiveness Statement specific to OU2 |
| 3 | Short-term Protective | The 2012 FYR did not list a Protectiveness Statement specific to OU2; however, the Sitewide Protectiveness Statement addressed issues specific to OU3. |
| Sitewide | Short-term Protective | The remedy at the Site is currently protective of human health and the environment because immediate threats have been addressed.<br><br>Land use easements have been attached to the properties that make up the Site. The land use easements provide UDEQ and EPA access to perform groundwater monitoring, inspections, restrict excavation activities and groundwater use. These restrictions act as ICs for the Site and outline the requirements for disturbing soils, drilling new groundwater wells and allowing access to the Site.<br><br>The residents and businesses in the area are connected to the municipal water system. Present levels of COCs in groundwater are consistent with the level and extent of contamination summaries described in the OU3 ROD.<br><br>Neither off-site migration in the shallow aquifer nor migration of COCs from the shallow aquifer to the intermediate aquifer is apparent. However, for the remedy to be protective in the long term, the following actions need to be taken: the correct analytical methods for the Site must be implemented and the required semi-annual sampling reports must be submitted in a timely manner.<br><br>Because the remedies are currently protective, the Site is currently protective of human health and the environment. |

**Table VII: Status of Recommendations from the 2012 FYR**

| OU # | Issue | Recommendations | Current Status | Current Implementation Status Description | Completion Date (if applicable) |
|---|---|---|---|---|---|
| 3 | The Utah Unified State Laboratory began analyzing all samples using method 6010 rather than Method 200.8 in October 2009. Method 6010 has a Method Detection Limit (MDL) higher that established cleanup goals for several analytes at the Site | UDEQ corresponded with the lab regarding this issue on 6/28/12 and provided the required cleanup goals for the Site. The lab agreed to provide UDEQ a proposal of alternate analytical methods with MDLs below cleanup goals. UDEQ will provide EPA a letter report on the proposal and recommended and selected analytical methods | Completed | UDEQ arranged to use the Region 8 ESAT lab program for metals and mercury analysis in order to achieve appropriate MDLs. TDS, pH and Chromium analysis is performed by a local lab due to the 24 hour holding time associated with those analyses. | 6/1/2014 |
| 3 | The paint on many of the monitoring wells is fading and or chipped. | UDEQ will repaint the faded/chipped wells. | Completed | The monitoring wells with faded and chipped paint were repainted. | 10/15/2013 |
| 3 | Monitoring Wells PWT, P2DA, B6I, B6S and B7S have been severed at ground level. | UDEQ will repair PWT and P2DA. Because of their location in an active automobile junkyard, B6I, B6S and B7S will be abandoned and relocated to a more appropriate location by UDEQ | Considered But Not Implemented | Due to development of the property, PWT and P2DA have been abandoned and relocated. | 7/1/2015 |
| 3 | Monitoring well P3FA consistently dries out and produces extremely silty water. | UDEQ will evaluate P3FA to determine if the issues of dryness and siltiness are related to well construction and/or site conditions. | Considered But Not Implemented | The production problems at P3FA observed in the 2012 FYR appear to be the result of groundwater fluctuation and not related to well construction. Since 2014, P3FA has consistently produced enough groundwater to collect samples. Groundwater continues to contain a high level of entrained sediment. The sediment passes freely through a 5 micron filter and is likely not related to well construction. | |
| 3 | UDEQ has not submitted semi-annual sampling reports to EPA since 2008. | UDEQ will submit the 2008-2011 semi-annual reports to EPA on a monthly basis beginning September 2012. UDEQ will submit all future semi-annual reports to EPA within three months of receiving sampling results. | Ongoing | UDEQ has submitted semi-annual sampling reports on a regular basis; however, due a change in project managers the latest report submitted to EPA is the June 2015 report. | Ongoing |
| 3 | TDS and pH samples have not been collected on a regular basis at monitoring well P3BB. | UDEQ will collect TDS and pH samples during each semi-annual sampling event from P3BB | Addressed in Next FYR | UDEQ collected TDS and pH samples during Semi-annual sampling events from 2012 through November 2017, at which time it was observed that well P3BB had been abandoned and removed by a company performing construction on the Site. UDEQ is currently coordinating the replacement of P3BB with the construction company and property owners. | |

# IV. FIVE-YEAR REVIEW PROCESS

## Community Notification, Involvement & Site Interviews

The FYR Public Notice was published in the *Salt Lake Tribune and Deseret News* newspapers on Wednesday, August 2, 2017. The announcement described the CERCLA Five-Year Review process and objectives, and informed the public how to contact UDEQ and EPA for additional information or to provide comments. A copy of the announcement is provided in Appendix E

As part of the Five-Year Review, UDEQ interviewed stakeholders to discuss the review and address any concerns or issues with the Site for protecting human health and the environment. No responses were received from the public notice. Community interviews were conducted August 3-14, 2017. Community interviews for the Five-Year Review consisted of interviews with representatives from Salt Lake City Public Utilities, Salt Lake Valley Health Department, and a Charter School constructed in 2016. Specific interview questions and responses are provided in Appendix E of this report.

## Data Review

Since there are no active operating systems for OU1 and OU2 no data has been collected since the 2012 FYR and there is no data from those OUs to review.

### OU3 Groundwater Monitoring

Monitoring of groundwater at the Site began in 1999. Monitoring activities are done in accordance with the OU3 ROD and the O&M Plan. Monitoring wells are sampled to evaluate the effectiveness of the natural attenuation remedy, reduce contaminant levels in the shallow aquifer, and to ensure groundwater contamination is not migrating into the intermediate aquifer or off-site.

Figure 3 shows the locations of the shallow aquifer monitoring wells currently being used as well as those that have been removed/damaged. Figure 4 shows the locations of the intermediate aquifer wells currently being used, as well as those that have been removed/damaged. All monitoring wells are monitored for arsenic, cadmium, chromium, lead, manganese, molybdenum, total dissolved solids and pH.

Arsenic and molybdenum concentrations in the shallow aquifer have remained high since the 2012 Five-Year Review. Chromium, molybdenum, cadmium, and arsenic have been detected above Site cleanup goals in the intermediate aquifer during isolated monitoring events. Currently, there is not enough historical sampling data, within the expected cleanup time frame of 100 years to explain these isolated detections.

***Shallow aquifer wells**:*

Eleven wells were used to monitor the concentration of contaminants in the shallow aquifer during this FYR period (PWEA, PWBA, PWKA, P2FA, P2HA, P2BA, P3CC, P3DA, P3FA, P3BB, and P3GB) and are shown on Figure 4. Three of those wells are located on West Site, three are located on Site Two, and five are located on Site Three. Wells PWKA, P2HA and P3BB have been damaged or removed during this FYR period due to development at the Site. Concentration time plots for each constituent monitored in the shallow aquifer can be found in Appendix B. The concentration time plots for wells PWKA and P2HA show all data available from 2012 to 2017. Well P3BB was not sampled for a long enough period to generate meaningful data.

**Groundwater Elevations and Flow – Shallow Aquifer**

UDEQ reviewed groundwater elevation data for the shallow aquifer. The elevation of the shallow aquifer has remained fairly constant with some seasonal fluctuations. Groundwater in the shallow aquifer continues to flow from the perimeter of the Site towards the City Drain.

**Arsenic:**

Arsenic concentrations have consistently remained above the 64.0 µg/L cleanup goal in PWEA, P2HA, P3CC and P3FA. The highest arsenic concentrations are found at the northern portion of the site in P3FA and decrease to the south. Site wide arsenic concentrations have remained fairly constant over time with no observable average reduction in arsenic concentrations. Given the expected cleanup time frame of 100 years, the effectiveness of the remedy cannot yet be evaluated, but will continue to be assessed during sampling events and future FYRs.

**Cadmium:**

Cadmium concentrations have been consistently below the cleanup goal of 6.20 µg/L throughout the Site. Historically the cadmium concentrations in well P3FA have fluctuated above and below the cleanup goal, however, the cadmium concentrations at well P3FA have been below the cleanup goal since November 2015.

**Chromium:**

Chromium concentrations have been consistently below the cleanup goal of 100 µg/L in the majority of wells throughout the Site, with chromium concentrations fluctuating above and below the cleanup goal in well P3FA.

**Lead:**

Lead concentrations have been consistently above the cleanup goal of 15.0 µg/L in well P3FA with seasonal fluctuations influencing the lead concentrations. Lead concentrations in well P3DA have fluctuated above and below the cleanup goal. Lead concentrations have been consistently below the cleanup goal in the remainder of the wells throughout the Site.

**Manganese:**

Manganese has consistently fluctuated above and below the cleanup goal of 440 µg/L in well P3FA. Manganese was detected above the cleanup goal of 440 µg/L in wells PWKA and P3DA during the November 2015 sampling event but has not been detected in subsequent sampling. Manganese concentrations have been consistently below the cleanup goal in the remaining wells.

**Molybdenum:**

Molybdenum concentrations have consistently remained above the cleanup goal of 182 µg/L in wells PWEA, PWBA, P2BA, P2HA, P3FA, P3CC, and P3GB. Molybdenum concentrations at P3DA have fluctuated above and below the cleanup goal, suggesting that seasonal fluctuations in groundwater depth may be influencing molybdenum concentrations at well P3DA. Historically, the shallow aquifer has shown a consistent seasonal fluctuation of molybdenum concentrations with higher concentrations being observed in the fall. Given the expected cleanup time frame of 100 years the effectiveness of the remedy cannot be evaluated at this time; however the remedy will continue to be assessed during Semi-annual sampling events and future FYRs.

**pH:**

pH levels have remained fairly constant throughout all sampling events. pH has been consistently above the cleanup goal of 8.00 in most of the shallow wells throughout the Site.

***Intermediate Aquifer wells:***

Five wells have been used to monitor the concentrations of the COCs in the intermediate aquifer (PWU, PWS, P2EA, P3EA, and P3O). During the June 2016 and November 2016 sampling event, UDEQ discovered wells P2EA and PWU respectively, had been removed or destroyed. Beginning in June 2016, samples were collected from well P2M because P2EA was no longer serviceable. Concentration time plots for each constituent monitored in the intermediate aquifer can be found in Appendix C. The concentration time plots for P2EA and PWU contain data up to the date they were no longer accessible. Since data exists from only two sampling events for P2M, a concentration time plot is not included.

At the time the ROD was established, no elevated concentrations of monitored contaminants had been detected in the intermediate aquifer. Arsenic, molybdenum, and elevated pH were detected above their associated cleanup goals at monitoring well P3O during the April 2007 sampling event and have been detected sporadically in subsequent sampling at the Site.

**Groundwater Elevations and Flow – Intermediate Aquifer**

A review of historical groundwater elevations data indicates groundwater elevations have remained fairly constant in the intermediate aquifer with some apparent seasonal fluctuations. Groundwater elevations in the intermediate aquifer continue to be greater than those in the shallow aquifer indicating continued upward flow from the intermediate to the shallow aquifer. Groundwater levels in the intermediate aquifer have consistently demonstrated an upward flow from the intermediate to the shallow aquifer. Therefore, exceedances in the intermediate aquifer are likely not the result of downward flow from the contaminated shallow aquifer. If contaminants from the shallow aquifer are migrating to the intermediate aquifer, the transport mechanism is unclear.

**Arsenic:**

Arsenic concentrations were well above the cleanup goal of 64.0 µg/L in well P3O at the beginning of this FYR period with a concentration of 220 µg/L. Arsenic concentrations in well P3O have decreased in the last five years. The arsenic concentration in well P3O for the June 2016 sampling was 66.6 µg/L and the arsenic concentrations for the November 2016 sampling was 39.8 µg/L. Arsenic concentrations have not been detected at levels greater than the cleanup goal in the remaining intermediate wells

**Cadmium:**

Cadmium concentrations have not been detected at levels greater than the cleanup goal of 6.20 µg/L in any of the intermediate wells during the FYR period.

**Chromium:**

Chromium concentrations have not been detected at levels greater than the cleanup goal of 100 µg/L in any of the intermediate wells during the FYR period.

**Lead:**

Lead was detected above the cleanup goal of 15.0 µg/L in well PWU during the June 2015 sampling event;

however, lead has not been detected above the cleanup goal in well PWU in subsequent sampling events. Lead was not detected at concentrations greater than the cleanup goal in the remaining intermediate wells during the FYR period.

**Manganese:**

Manganese was detected above the cleanup goal of 440 µg/L in well PWU during the June 2015 sampling event. Manganese has not been detected above the cleanup goal in well PWU in subsequent sampling events. Manganese was not detected at concentrations greater than the cleanup goal in the remaining intermediate wells during the FYR period.

**Molybdenum:**

Molybdenum concentrations have been consistently above the cleanup goal of 182 µg/L in well P3O during the FYR period. Molybdenum was not detected at concentrations greater than the cleanup goal in the remaining intermediate wells during the FYR period.

**pH:**

The pH values have remained fairly constant in the intermediate aquifer during the FYR period. The pH has generally remained below or slightly above the cleanup goal of 8.00 standard units

**Surface Water and City Drain Discharge Wells Monitoring**

Surface water in the City Drain (City Drain Point of Compliance - POC) is monitored for aluminum, arsenic, cadmium, chromium, chromium VI, copper, lead, mercury, manganese, molybdenum, nickel, selenium, silver, zinc, pH, and TDS to ensure that in-stream concentrations do not exceed 125% of Class 3D water use. In addition, shallow wells near the City Drain (P3FA, P3DA, P3CC, P2FA, and PWEA) are analyzed for aluminum, chromium VI, copper, iron, mercury, nickel, selenium, silver, and zinc in order to monitor alternate concentration limits (ACLs) established for surface water in the ROD. These apply only where groundwater discharges to surface water. The collection points for these samples are shown in Figure 5.

A review of surface water concentrations data from the POC during the FYR period indicates that the following constituents have exceeded the surface water performance standards: Aluminum, copper, lead, iron, and selenium. These exceedances have been sporadic and do not demonstrate any discernable trends.

A review of contaminant concentrations data from the City Drain Discharge Wells during the FYR period indicates that aluminum and iron concentrations in well P3FA have been consistently above the respective ACLs of 4,500 µg/L and 25,800 µg/L since May 2013. There have been exceedances of other contaminants in P3FA as well as P3DA, PWEA and P2FA, but these exceedances have been sporadic and do not demonstrate any discernable trends.

## Site Inspection

The inspection of the Site was conducted on 7/19/2017. In attendance were Thomas Daniels (UDEQ) and Dave Allison (UDEQ). The purpose of the inspection was to assess the protectiveness of the remedy.

Inspection of the Site showed that significant development has taken place since 2012. Development since 2012 consists of the construction of the Wallace Stanger Charter School, a waste/recycling center, a Boiler Maker Training Facility, AAA Barricade (a warehouse and barricade stock pile area), and road construction and foundations for the Redwood Depot development. (Figure 6)

Shallow aquifer wells PWEA, PWBA, P2FA, P2HA, P2CA, P2GA, P2BA, P3CC, P3DA, P3FA, and P3GB and intermediate wells PWS, P2M, P3EA and P3O are intact and accessible. Wells P3GB and P3O have been incorporated into the design of the concrete slab construction outside of one of the Redwood Depot buildings. In areas that remain undeveloped the fill, landscaping and vegetation remain in good condition.

Wells PWT, PWDA, PWU, PWKA, P2EA and P3BB have been removed/damaged and no longer accessible.

# V. TECHNICAL ASSESSMENT

**QUESTION A:** Is the remedy functioning as intended by the decision documents?

Yes. The review of documents, risk assumptions and results of the Site Inspection indicates that the remedies at OU1, OU2, and OU3 are functioning as intended by the OU1, OU2, and OU3 RODs.

**Question A Summary:**

***Remedial Action Performance***

The excavation of CKD, separation of chromium-bearing brick form the CKD, off-site disposal, back filling and revegetation of the Site described in the OU1 and OU2 RODs has minimized migration of contaminants to groundwater and surface water and prevent direct contact and ingestion contaminants in soil.

The MNA remedy appears to be functioning as described in the OU3 ROD. Monitoring results indicate levels of arsenic and molybdenum in the shallow aquifer continue to be above associated cleanup goals. Groundwater from the shallow aquifer continues to flow from the perimeter of the Site toward the City Drain and groundwater level measurements in the intermediate aquifer continue to demonstrate flow from the intermediate aquifer to the shallow aquifer. Additional data is required to assess the effectiveness of the MNA remedy given the expected time frame of 100 years for cleanup goals to be achieved. Future groundwater monitoring will continue to assist with determining the progress of MNA at the Site.

The remedies for the OU1, OU2 and OU3 are functioning as intended by the decision documents.

***System Operations/O&M***

There are no active operating systems for OU1 and OU2 and no O&M requirements for OU1 and OU2. A network of groundwater monitoring wells was constructed at the Site to monitor concentrations of contaminants to ensure the effectiveness of the MNA remedy for OU3. O&M activities consist of semi-annual inspections and monitoring of the shallow/intermediate aquifers and surface water. Initially, samples were taken from 16 monitoring wells; however, due to changes in property ownership and development/construction activities a number of the original wells have been damaged or removed and can no longer be sampled.

Currently, nine shallow aquifer monitoring wells and three intermediate aquifer monitoring wells are sampled to evaluate the effectiveness of the natural attenuation remedy. UDEQ is currently coordinating replacement and/or repair of monitoring wells P3BB, PWU, PWKA and P2EA with property owners. The current monitoring well network provides sufficient data to assess the progress of the remedy. However, given the number of wells no longer in service, the effectiveness of the monitoring well network needs to be evaluated.

***Implementations of ICs and Other Measures***

Land use easements provide UDEQ and EPA access to the Site for inspections/sampling and/or provide restrictions on soil excavation and groundwater use. The easements include prohibitions on the use/disturbance of groundwater, excavation activities (including disturbance of clean fill) and any other activities or actions that might interfere with

the implemented remedy. The easements include property owner notification to UDEQ of any occurrences that might impair the integrity of the cap and require UDEQ approval of construction work on the Site.

Considerable development has taken place on parcels within the Site, including the construction of a charter school, several warehouses, an indoor soccer stadium, and upgrades to the Orange Street Sewer system that transects the Site. Additionally, Site 3 portion is part of the Redwood Depot development project and significant construction activities have and are currently taking place on the property. Buildings constructed on the Site are all "slab on grade" as required by the land use easements

Some of the development at the Site has been coordinated with UDEQ. However, other construction activities at the site were not coordinated with UDEQ and some property owners are not aware of the land use easements, prohibitions on groundwater use, coordination with UDEQ, or access granted for monitoring associated with the Site. Despite not being aware of the land use easements, property owners have allowed UDEQ access for monitoring/inspection activities and have expressed a desire to repair/replace damaged wells.

UDEQ's overall assessment of the institutional controls is that the easements need to be re-evaluated and increased coordination with Salt Lake City Public Utilities and the Salt Lake Valley Health Department is necessary for institutional controls to remain effective.

**QUESTION B:** Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

**Question B Summary:**

Yes. There have been no changes in the physical condition of the Site that affect remedy protectiveness.

***Changes in Standards and TBCs***

There have been no changes in the COC standards for soil, surface water or groundwater since the last review.

***Changes in Risk Assessment Methods***

There have been changes to exposure assumptions and toxicity information since the development of the OU1, OU2 and OU3 RODs. Because these documents were developed prior to EPA's RAGS Part F (2009) guidance, the exposure assumptions for inhalation were conducted differently. The inhalation pathway is minor compared to the soil ingestion pathway, which is the major risk factor at the Site. Revising exposure assumptions would not change the cleanup levels for OU1, OU2 and OU3.

***Changes in Toxicity and Other Contaminant Characteristics***

Under the current EPA Office of Land and Emergency Management policy, the soil lead screening level was established so that a typical child or similarly exposed group of children would have an estimated probability of no more than 5 percent of exceeding a blood lead level (BLL) of 10 micrograms per deciliter (µg/dL). The 10 µg/dL BLL target concentration is based (in part) on the 1991 Center for Disease Control's (CDC) blood lead "level of concern." In 2012, CDC accepted the recommendations of its Advisory Committee on Childhood Lead Poisoning Prevention that the "level of concern" be replaced by a reference value based on the 97.5th percentile of the National Health and Nutrition Examination Survey-generated BLL distribution in children 1-5 years old (currently 5 µg/dL).

EPA is in the process of updating its policy based on recent studies. The most recent scientific literature on lead toxicology and epidemiology provide evidence that adverse health effects are associated with BLL less than 10 µg/dL and there is no apparent threshold level for adverse effects. EPA Region 8 will continue to use the current EPA policy, until the Agency finalizes and updates its policy.

***Changes in Exposure Pathways***

No changes in Site conditions that affect exposure pathways were identified during the FYR. The Site is being developed as an industrial/commercial complex. No new contaminants, sources or routes of exposure were identified during the FYR.

***Expected Progress Towards Meeting RAOs***

It is too early to assess the effectiveness of the OU3 remedy given the expected time frame of 100 years for cleanup goals to be achieved.

**QUESTION C:** Has any other information come to light that could call into question remedy protectiveness? No.

# VI. ISSUES/RECOMMENDATIONS

| **Issues/Recommendations** | | | | |
|---|---|---|---|---|
| **OU(s) without Issues/Recommendations Identified in the Five-Year Review:** | | | | |
| *None* | | | | |
| **Issues and Recommendations Identified in the Five-Year Review:** | | | | |
| **OU(s): OU1, OU2, OU3** | **Issue Category: Institutional Controls** | | | |
| | **Issue:** Considerable development has taken place on parcels within the Site, some of which has not been coordinated with UDEQ. Some property owners are not aware of the existence of the land use easements nor of the prohibitions on groundwater use, coordination with UDEQ, or access granted for monitoring associated with the Site. | | | |
| | **Recommendation:** Increased coordination with Salt Lake City Public Utilities and Salt Lake Valley Health Department regarding construction activities and building permits near and within the Site boundaries. Determine if land use easements are being attached to property titles during property transfers. | | | |
| **Affect Current Protectiveness** | **Affect Future Protectiveness** | **Party Responsible** | **Oversight Party** | **Milestone Date** |
| No | Yes | State | EPA/State | 9/30/2018 |
| **OU(s): OU3** | **Issue Category: Monitoring** | | | |
| | **Issue:** Due to property ownership changes and development/construction activities, several monitoring wells have been damaged or removed. | | | |
| | **Recommendation:** Coordinate repair/replacement of wells with property owners. Evaluate effectiveness of remaining wells to determine if monitoring well network is sufficient. | | | |
| **Affect Current Protectiveness** | **Affect Future Protectiveness** | **Party Responsible** | **Oversight Party** | **Milestone Date** |
| No | Yes | State | EPA/State | 9/30/2018 |

**OTHER FINDINGS:**

None

## VII. PROTECTIVENESS STATEMENT

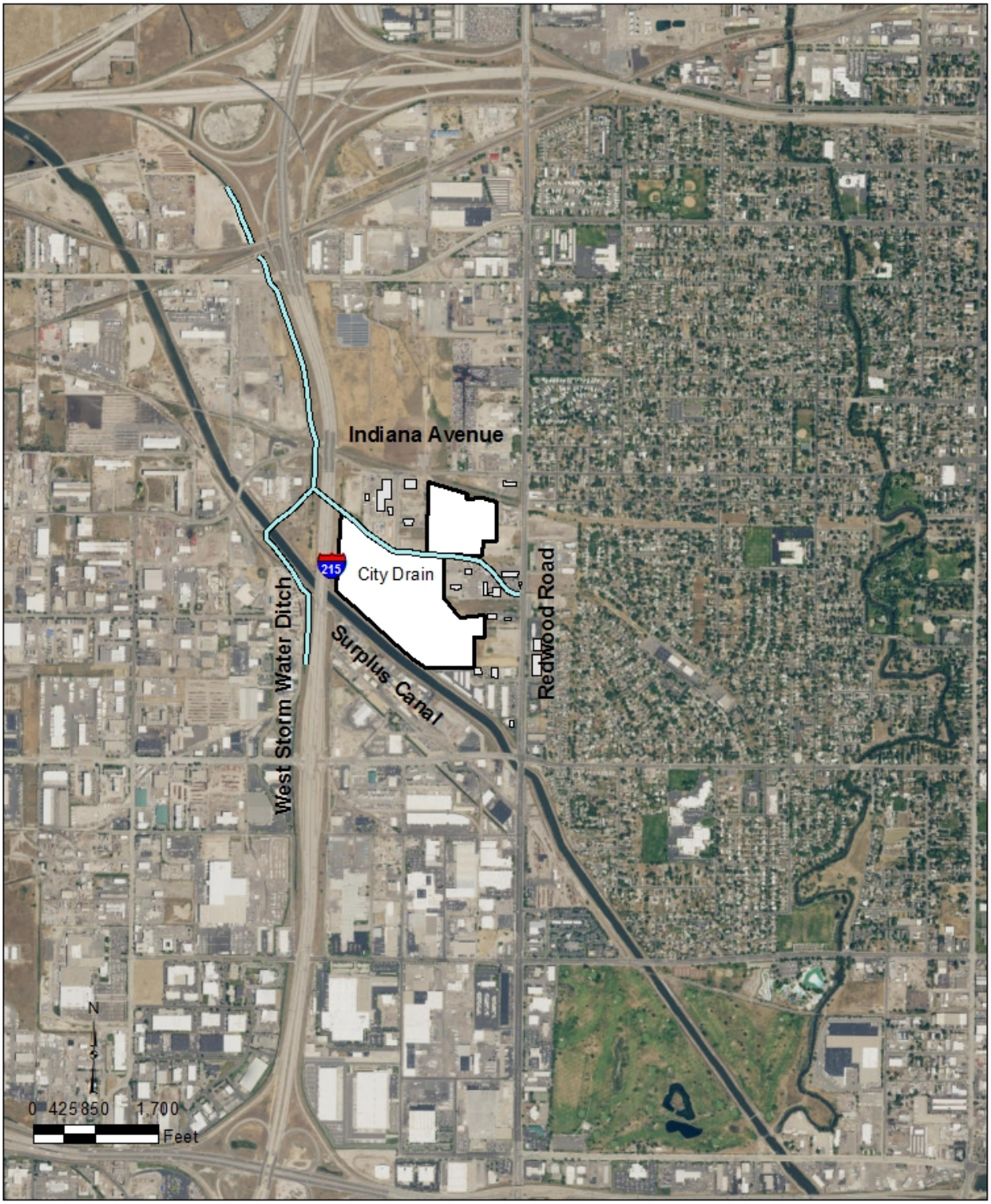
| Protectiveness Statement(s) | |
|---|---|
| *Operable Unit:*<br>OU1 | *Protectiveness Determination:*<br>Protective |
| *Protectiveness Statement:* The remedy implemented at OU1 is protective of human health and the environment. The immediate threats posed by contamination from the CKD and chromium-bearing brick have been addressed. The excavation and off-site disposal of contaminated soil has effectively eliminated the majority of the risk associated with the COCs. The risk associated with any contaminated soil remaining after construction activities is effectively reduced by clean fill, top soil and vegetation. | |
| *Operable Unit:*<br>OU2 | *Protectiveness Determination:*<br>Protective |
| *Protectiveness Statement:* The remedy implemented for OU2 is protective of human health and the environment. The immediate threats posed by contamination associated with OU2 have been addressed. The excavation and off-site disposal of contaminated soil have effectively reduced the risk of exposure to the COCs. The risk associated with any contaminated soil remaining after construction activities is effectively reduced by clean fill, top soil and vegetation. | |
| *Operable Unit:*<br>OU3 | *Protectiveness Determination:*<br>Protective |
| *Protectiveness Statement:* The remedy implemented for OU3 appears to be functioning as described in the OU3 ROD. Present levels of COCs in groundwater are consistent with the concentrations and extent of contamination summaries described in the OU3 ROD. Neither off-site migration in the shallow aquifer nor migration of COC from the shallow aquifer to the intermediate aquifer is apparent. Additional data is required to assess the effectiveness of the MNA remedy given the expected time frame of 100 years for cleanup goals to be achieved. Future groundwater monitoring will continue to assist with determining the progress of MNA at the Site. | |

| Sitewide Protectiveness Statement |
|---|
| *Protectiveness Determination:*<br>Protective |
| *Protectiveness Statement:* The Site is protective of human health and the environment. The immediate threats posed by the COCs have been addressed. The excavation and off-site disposal of contaminated soil effectively reduces the risk of exposure to lead and arsenic. Contaminated soil above unrestricted use levels is currently managed through the existing ICs. There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy. There have been no changes in the toxicity factors for the COCs or risk assessment methodology that could affect the protectiveness of the remedies for the Site. |

## VIII. NEXT REVIEW

The next five-year review report for the Portland Cement Superfund Site is required five years from the completion date of this review.

# FIGURES




Legend
Site Boundary
City Drain

Figure 1
Site Location
Five Year Review 2017
Portland Cement Site

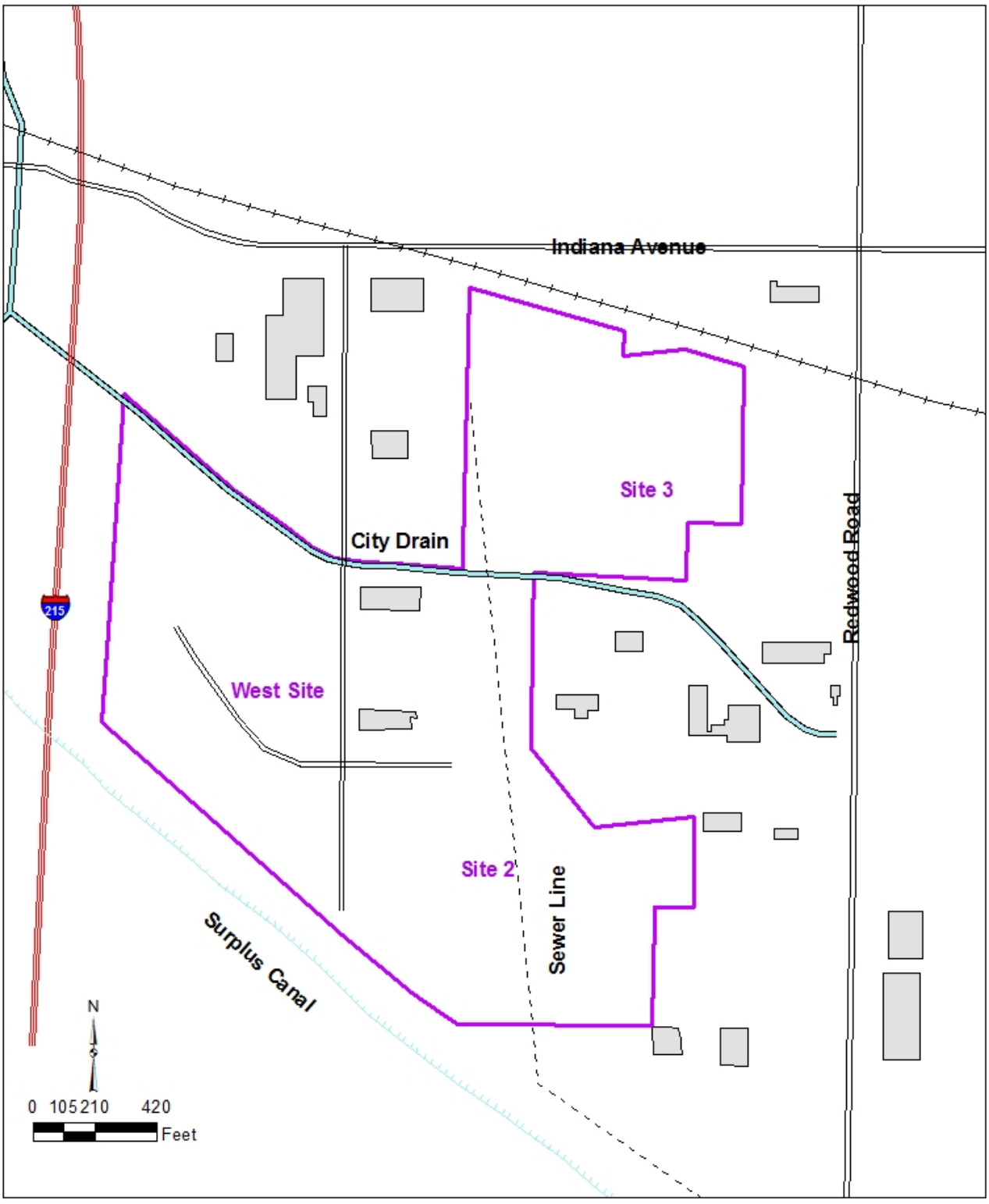
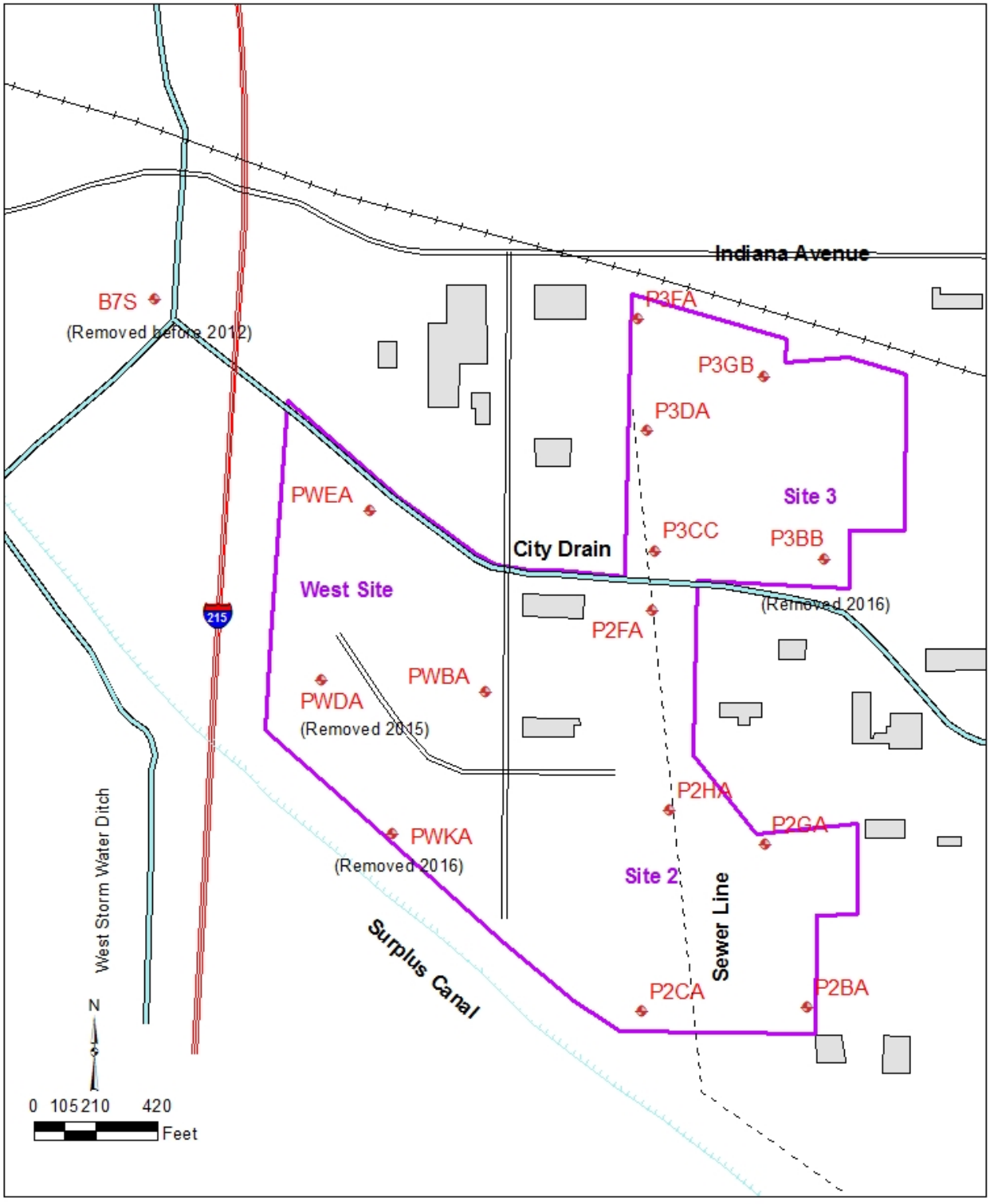
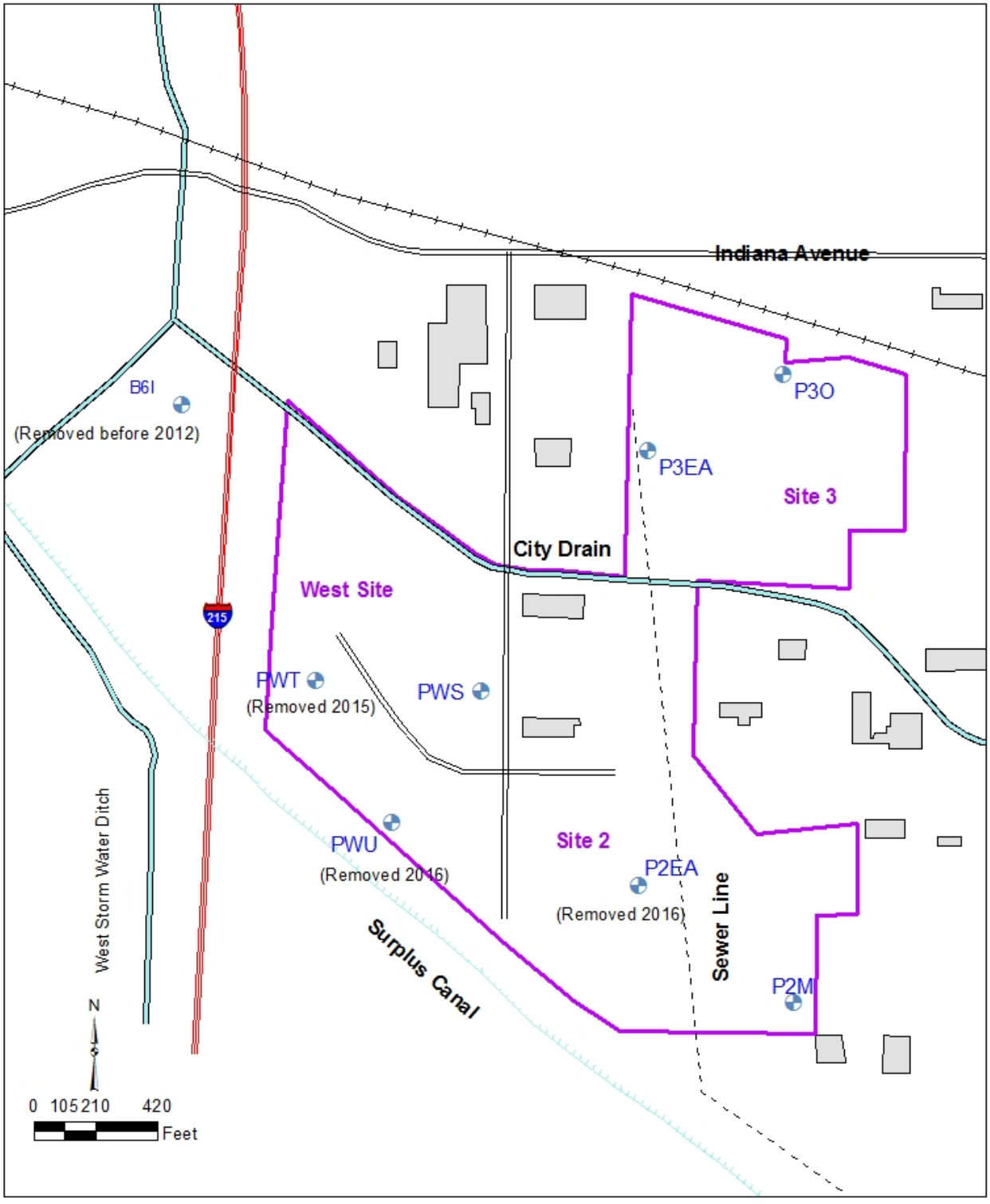



Figure 2
Site Boundaires and Operable Units
Five Year Review 2017
Portland Cement Site




Legend
- Sewer
- Surplus Canal
- City Drain
- Site Boundary

Figure 3
Shallow Aquifer Monitoring Well Locations
Five Year Review 2017
Portland Cement Site




Legend
- Sewer
- Surplus Canal
- City Drain
- Site Boundary

Figure 4
Intermediate Aquifer Monitoring Well Locations
Five Year Review 2017
Portland Cement Site

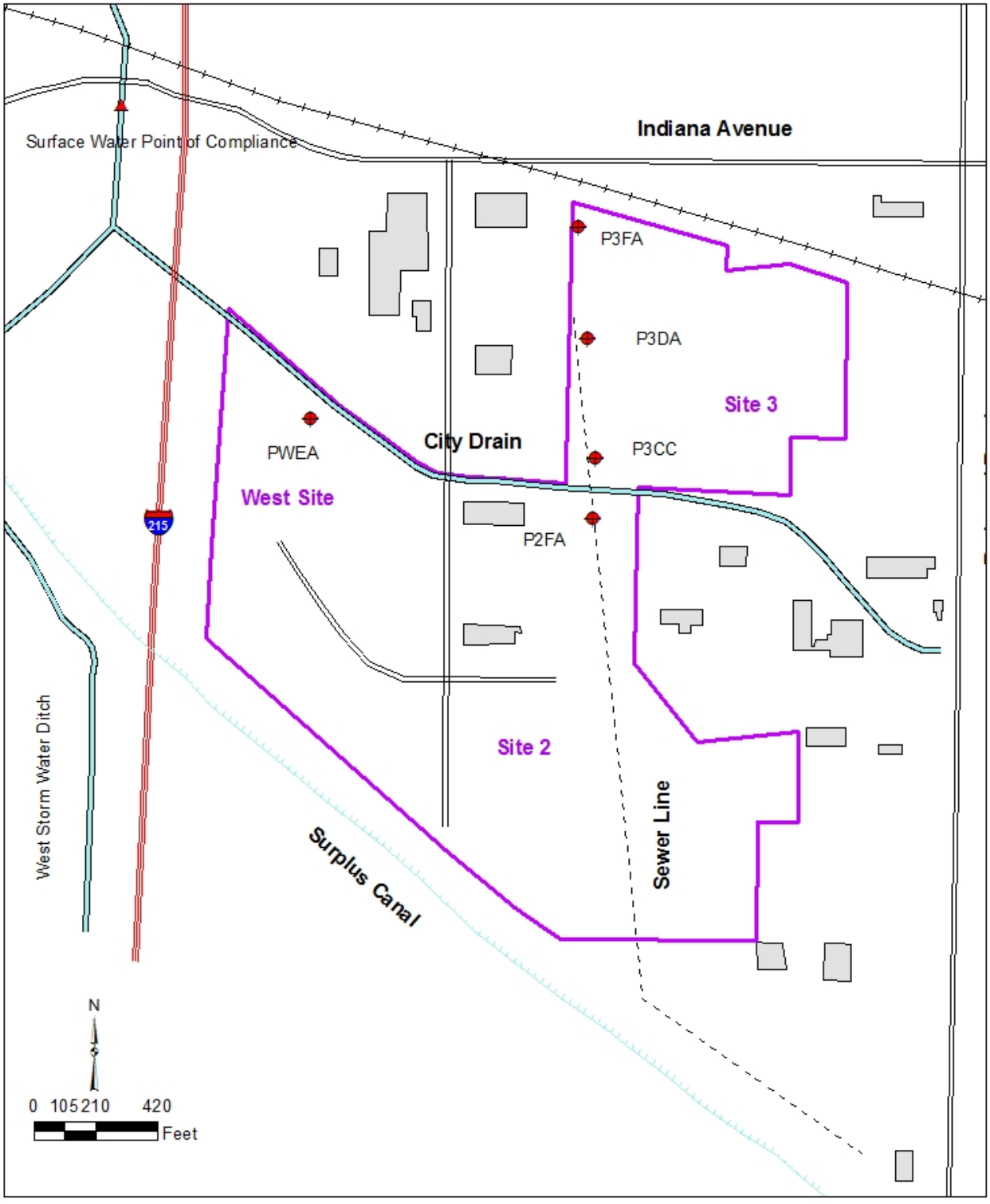
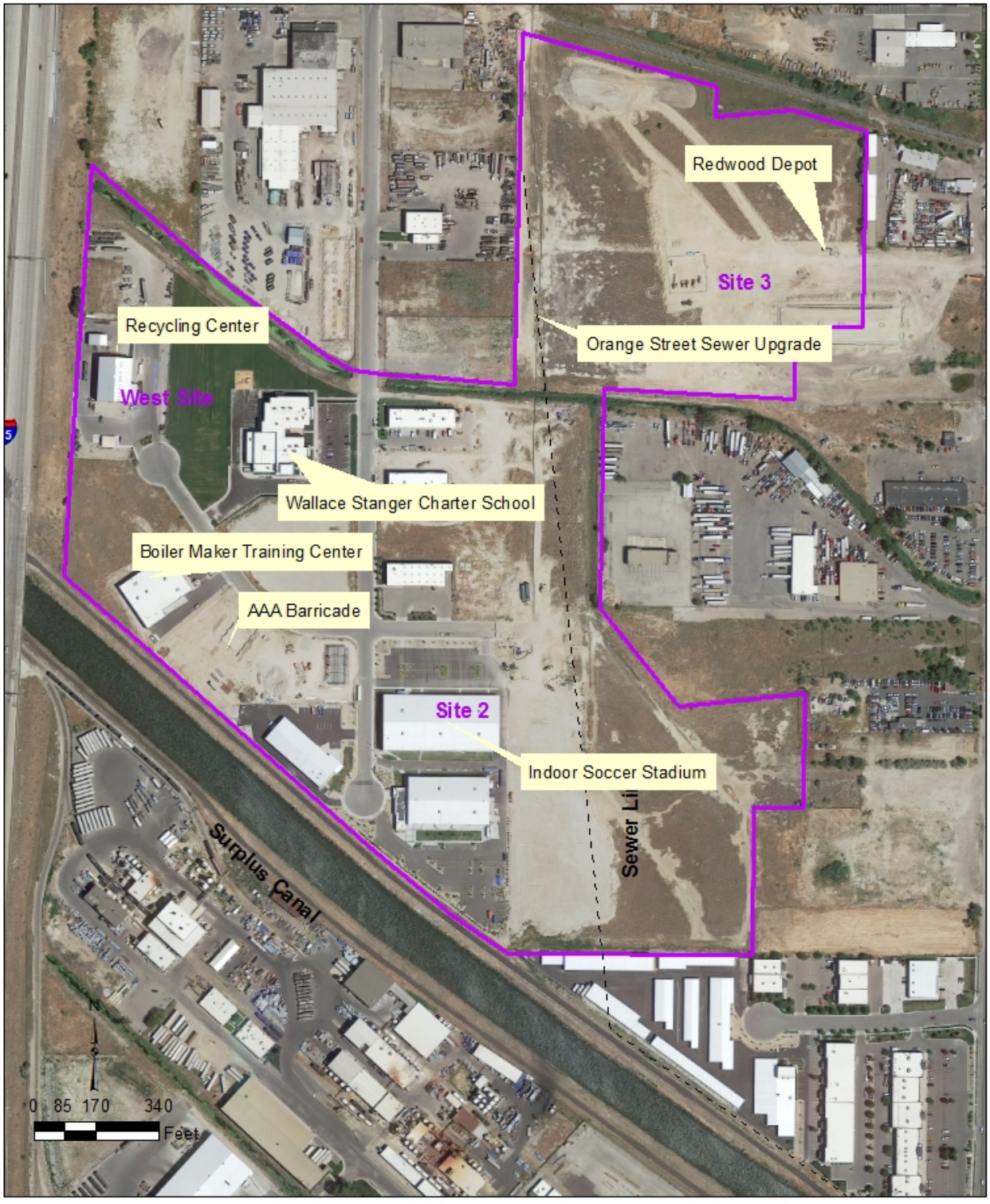



Figure 4
Intermediate Aquifer Monitoring Well Locations
Five Year Review 2017
Portland Cement Site




Legend
- - - Sewer
Site Boundary

Figure 6
Site Development
Five Year Review 2017
Portland Cement Site

APPENDIX A – REFERENCE LIST

Record of Decision Portland Cement Superfund Site, Operable Unit One

Record of Decision Portland Cement Superfund Site, Operable Unit Two

Record of Decision Portland Cement Superfund Site, Operable Unit Three

Operation and Maintenance, Monitoring Plan, Portland Cement Superfund Site

Third Five-Year Review, Portland Cement Superfund Site (2012)

Semi-Annual Monitoring Report, Portland Cement Site, OU3, October 2012

Semi-Annual Monitoring Report, Portland Cement Site, OU3, June 2013

Semi-Annual Monitoring Report, Portland Cement Site, OU3, October 2013

Semi-Annual Monitoring Report, Portland Cement Site, OU3, June 2014

Semi-Annual Monitoring Report, Portland Cement Site, OU3, November 2014

Semi-Annual Monitoring Report, Portland Cement Site, OU3, June 2015

American West Analytical Laboratories, Sample Analysis Report, Portland Cement Site, November 2015

ESAT Final Sample Analysis Report, Portland Cement Site, November 2015

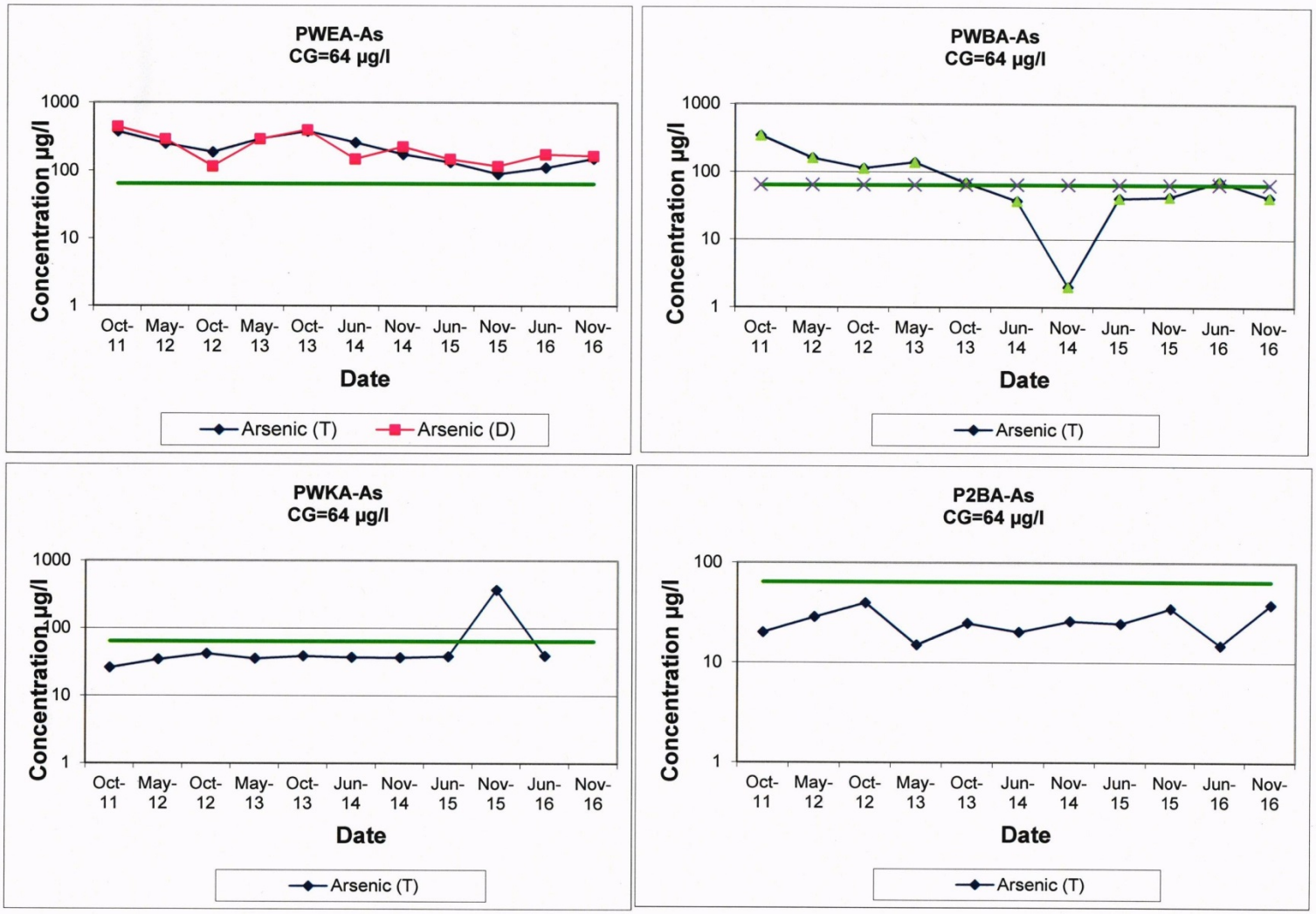
American West Analytical Laboratories, Sample Analysis Report, Portland Cement Site, June 2016

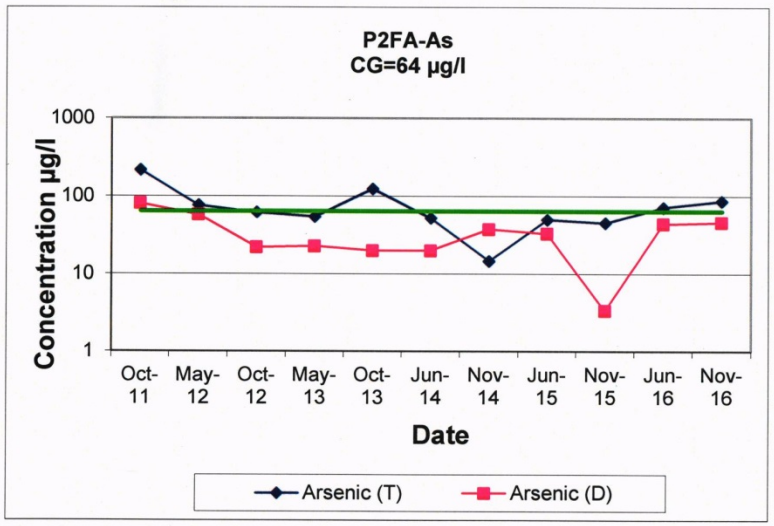
ESAT Final Sample Analysis Report, Portland Cement Site, June 2016

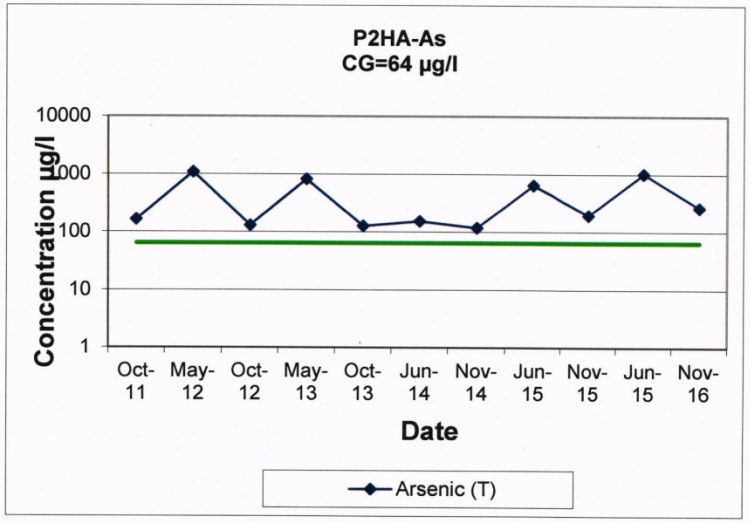
American West Analytical Laboratories, Sample Analysis Report, Portland Cement Site, November 2016

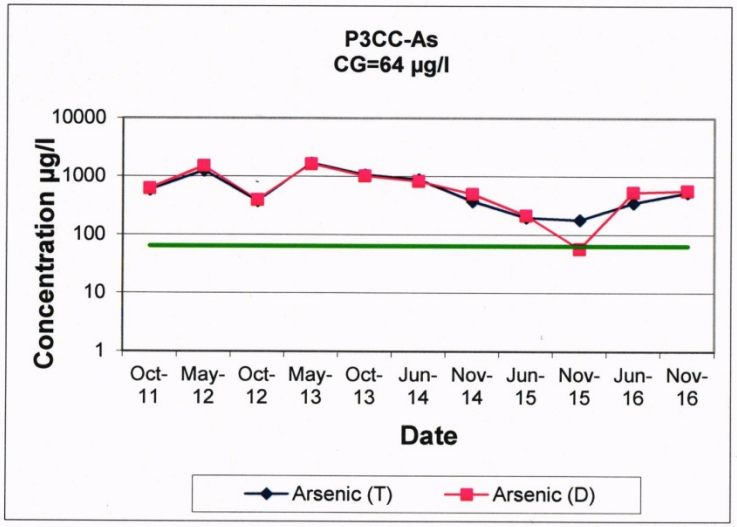
ESAT Final Sample Analysis Report, Portland Cement Site, November 2016

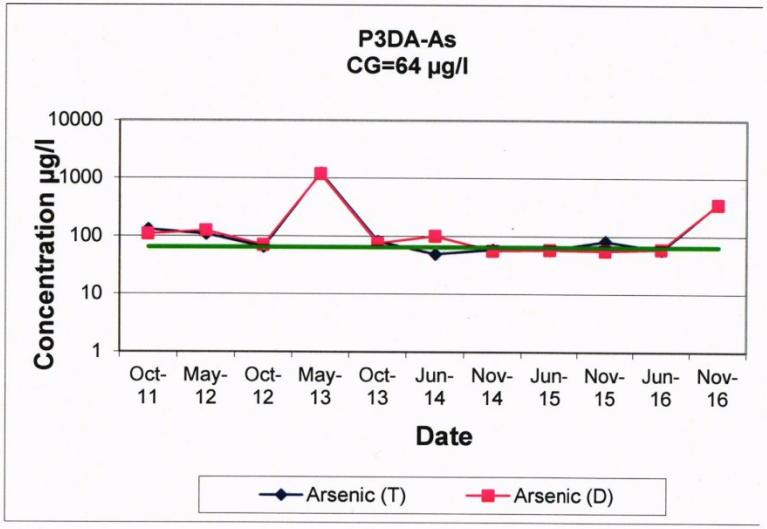
# APPENDIX B – SHALLOW AQUIFER CONCENTRATION TIME PLOTS

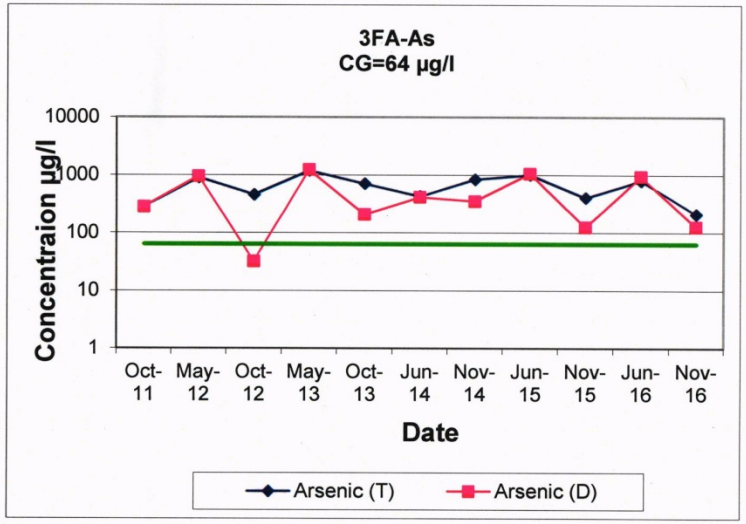

PWEA-As
CG=64 µg/l
Concentration µg/l
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Arsenic (T)
Arsenic (D)
PWBA-As
CG=64 µg/l
Concentration µg/l
Date
Arsenic (T)
PWKA-As
CG=64 µg/l
Concentration µg/l
Date
Arsenic (T)
P2BA-As
CG=64 µg/l
Concentration µg/l
100
10
1
Date
Arsenic (T)

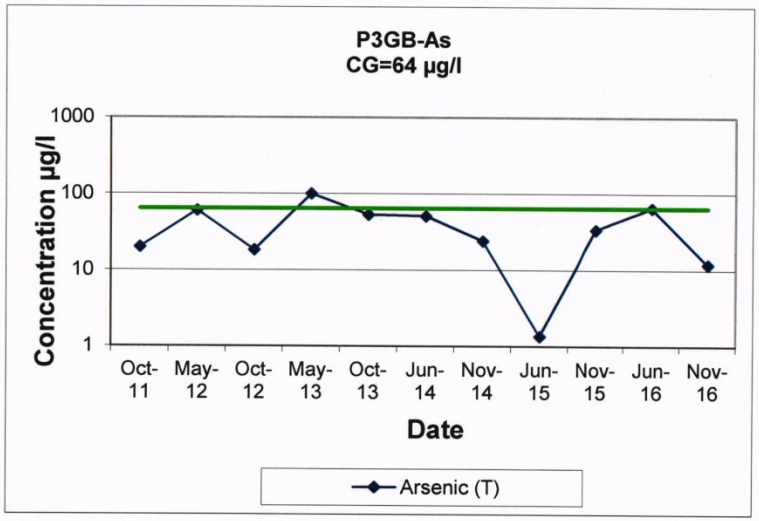

P2FA-As
CG=64 µg/l
Concentration µg/l
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Arsenic (T)
Arsenic (D)

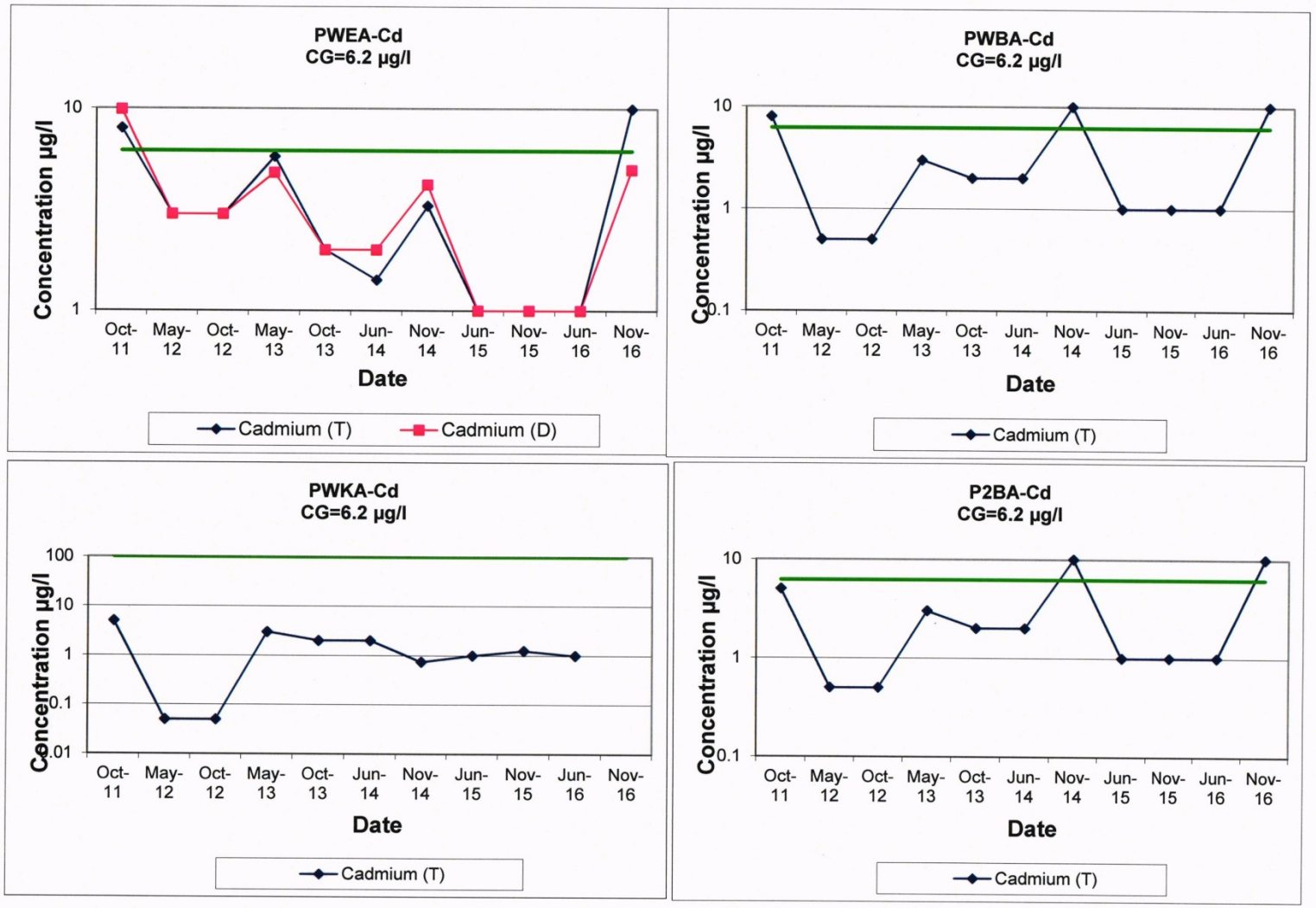

P2HA-As
CG=64 µg/l
Concentration µg/l
10000
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-15
Nov-16
Date
Arsenic (T)

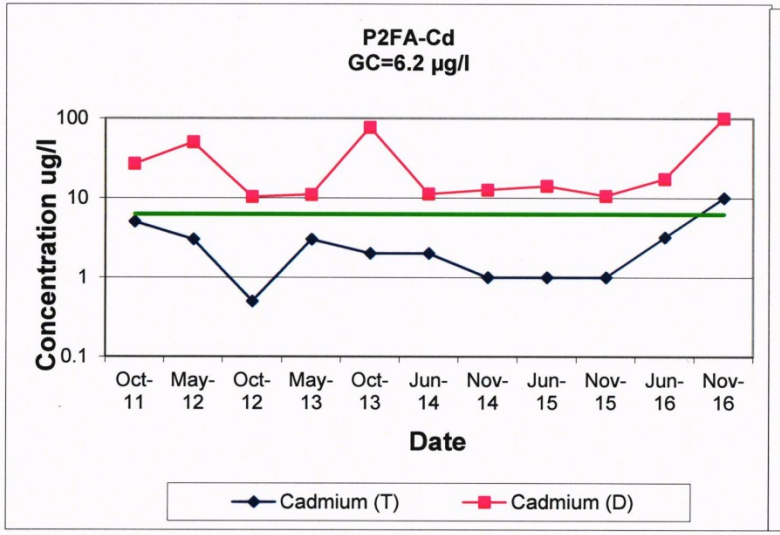

P3CC-As
CG=64 µg/l
Concentration µg/l
10000
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Arsenic (T)
Arsenic (D)

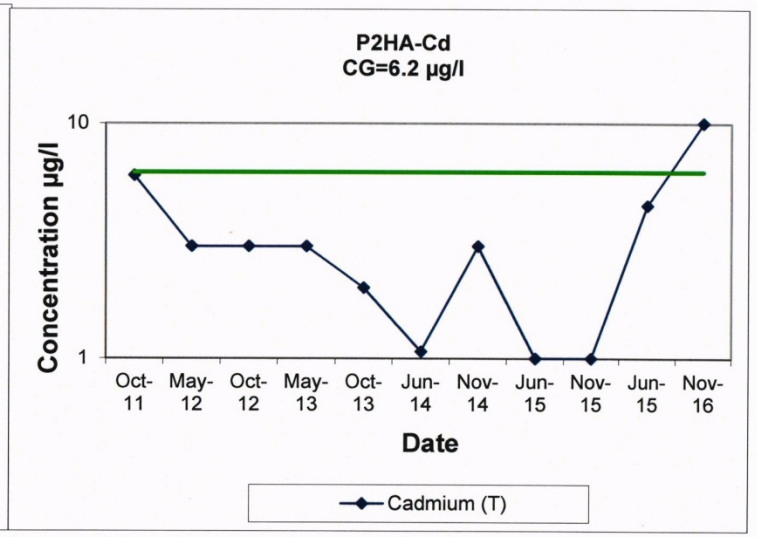

P3DA-As
CG=64 µg/l
Concentration µg/l
10000
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Arsenic (T)
Arsenic (D)

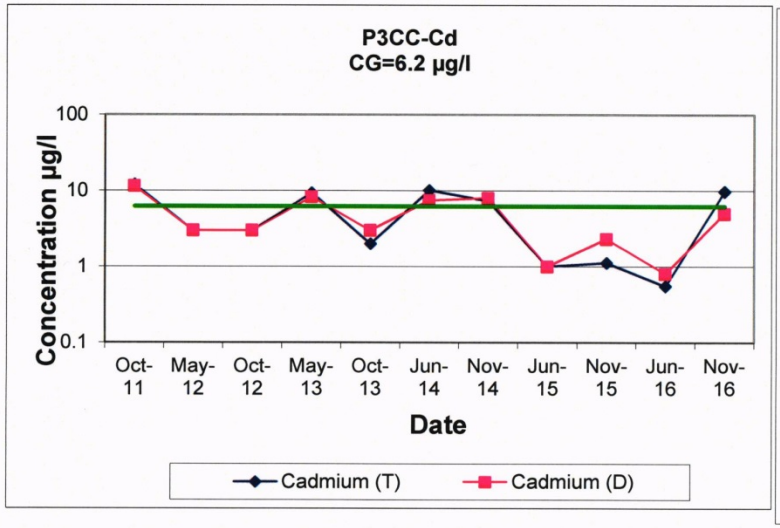

3FA-As
CG=64 µg/l
Concentraion µg/l
10000
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Arsenic (T)
Arsenic (D)

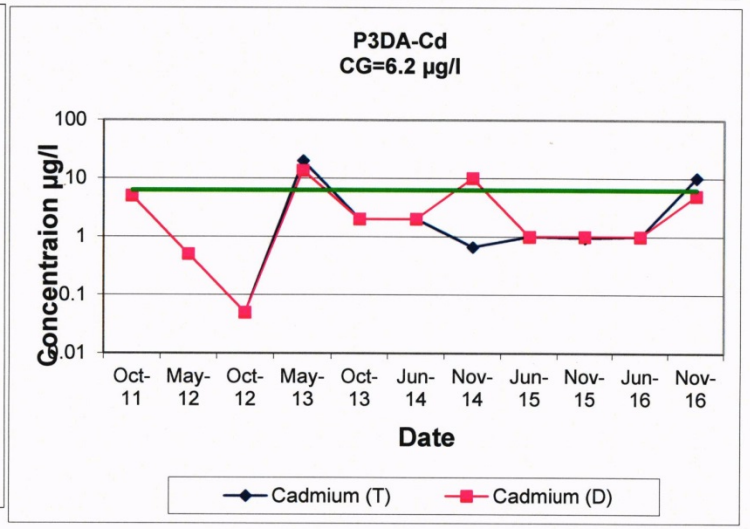

P3GB-As
CG=64 µg/l
Concentration µg/l
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Arsenic (T)

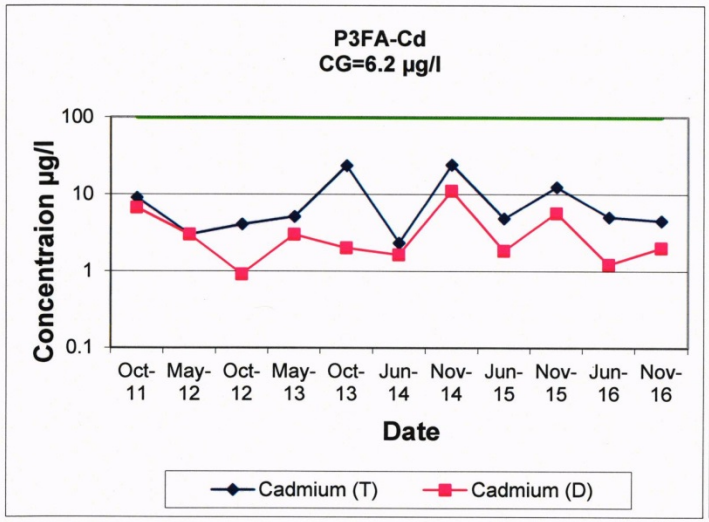

PWEA-Cd
CG=6.2 µg/l
Concentration µg/l
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Cadmium (T)
Cadmium (D)
PWBA-Cd
CG=6.2 µg/l
Concentration µg/l
10
1
0.1
Date
Cadmium (T)
PWKA-Cd
CG=6.2 µg/l
Concentration µg/l
100
10
1
0.1
0.01
Date
Cadmium (T)
P2BA-Cd
CG=6.2 µg/l
Concentration µg/l
10
1
0.1
Date
Cadmium (T)

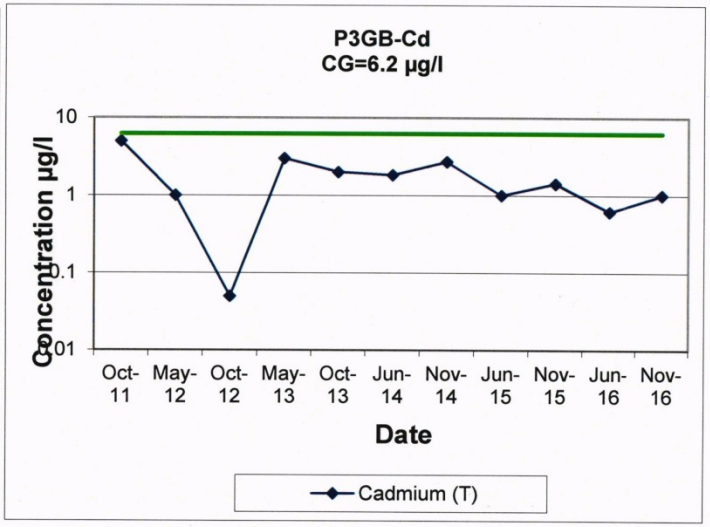

P2FA-Cd
GC=6.2 µg/l
Concentration ug/l
100
10
1
0.1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Cadmium (T)
Cadmium (D)

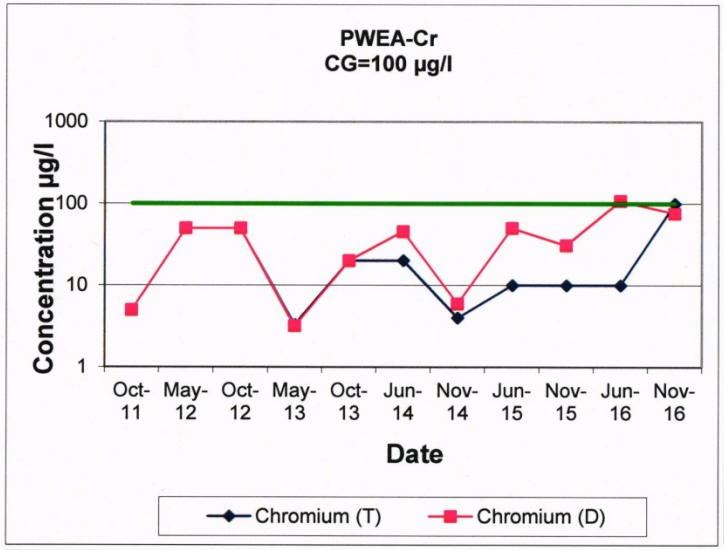

P2HA-Cd
CG=6.2 µg/l
Concentration µg/l
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-15
Nov-16
Date
Cadmium (T)

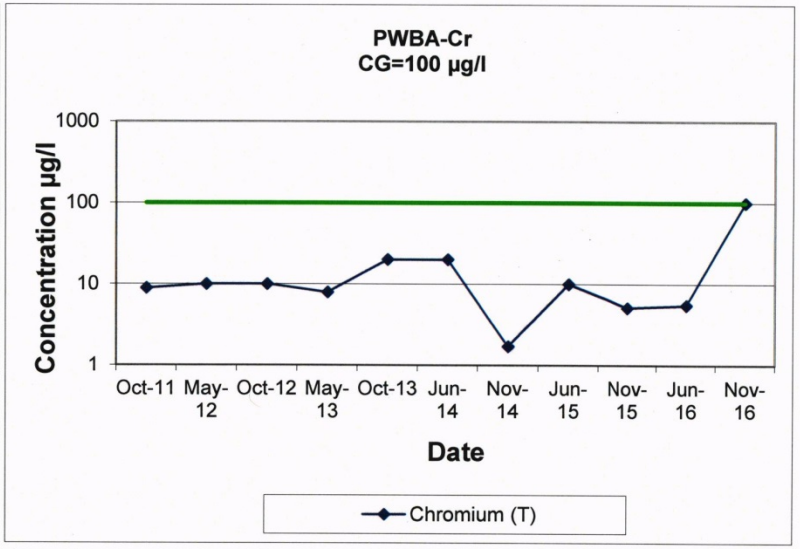

P3CC-Cd
CG=6.2 µg/l
Concentration µg/l
100
10
1
0.1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Cadmium (T)
Cadmium (D)

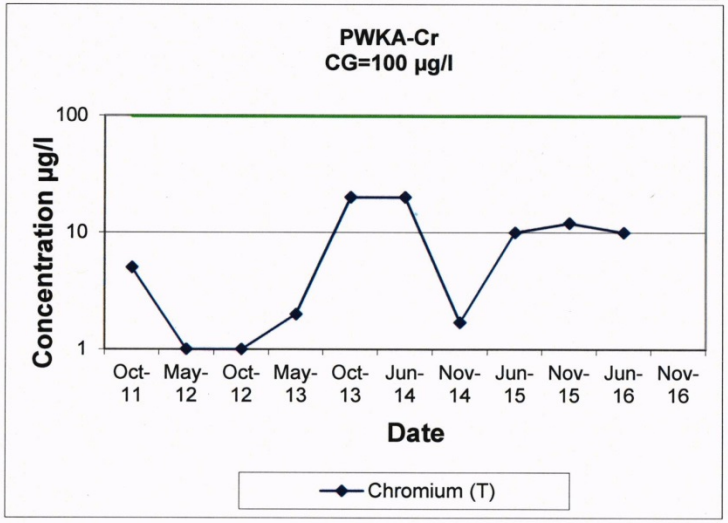

P3DA-Cd
CG=6.2 µg/l
Concentraion µg/l
100
10
1
0.1
0.01
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Cadmium (T)
Cadmium (D)

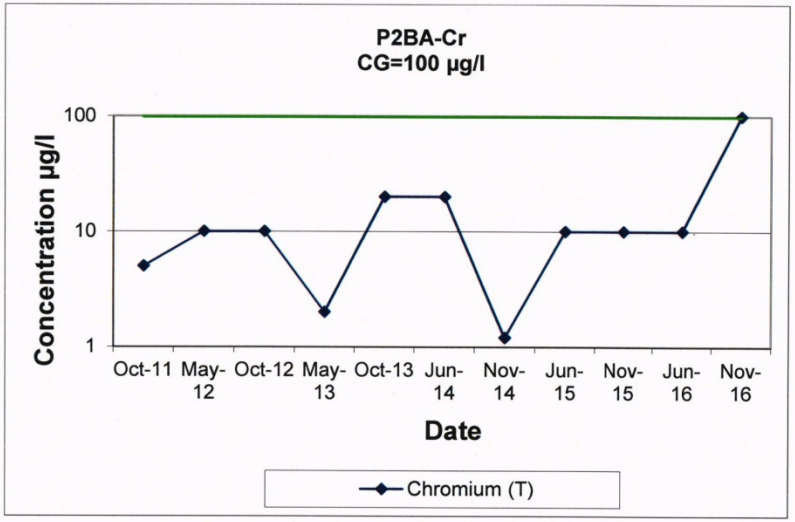

P3FA-Cd
CG=6.2 µg/l
Concentraion µg/l
100
10
1
0.1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Cadmium (T)
Cadmium (D)

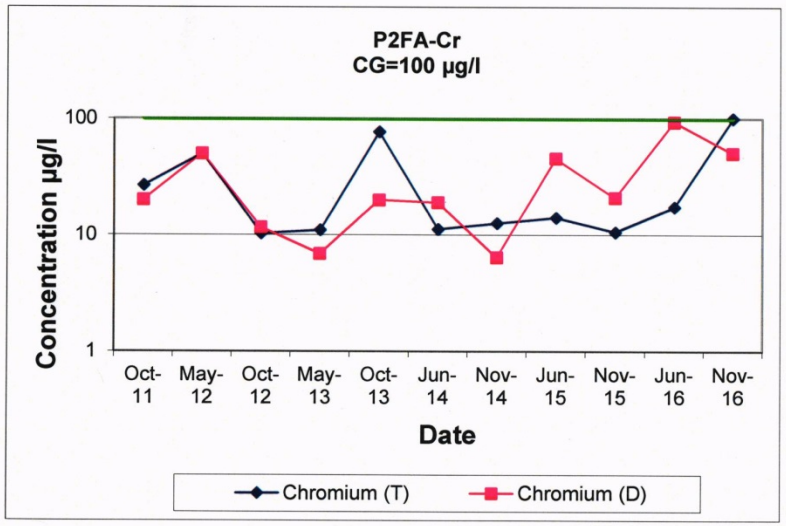

P3GB-Cd
CG=6.2 µg/l
Concentration µg/l
10
1
0.1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Cadmium (T)

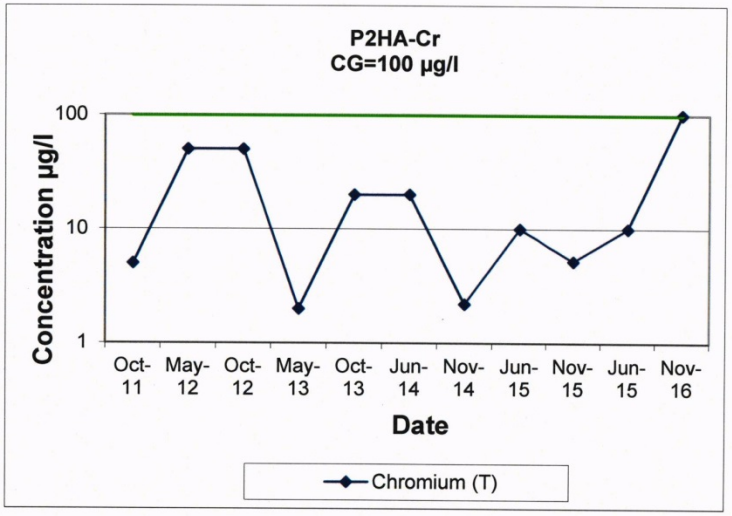

PWEA-Cr
CG=100 µg/l
Concentration µg/l
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Chromium (T)
Chromium (D)

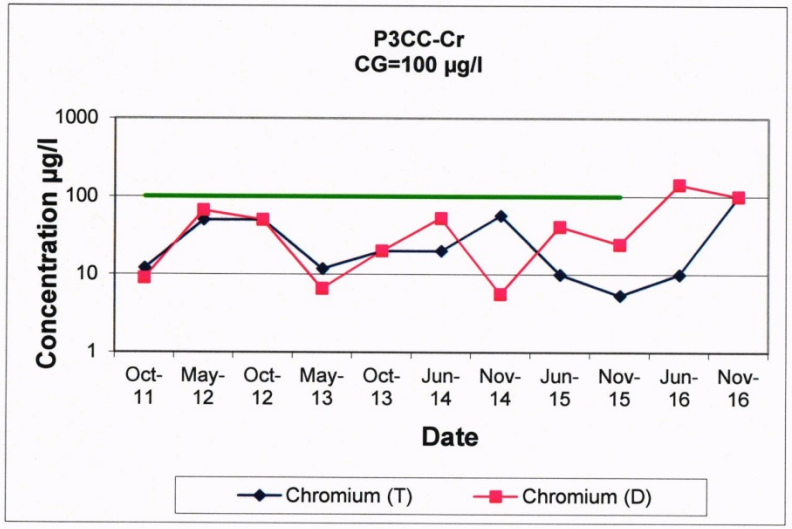

PWBA-Cr
CG=100 µg/l
Concentration µg/l
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Chromium (T)

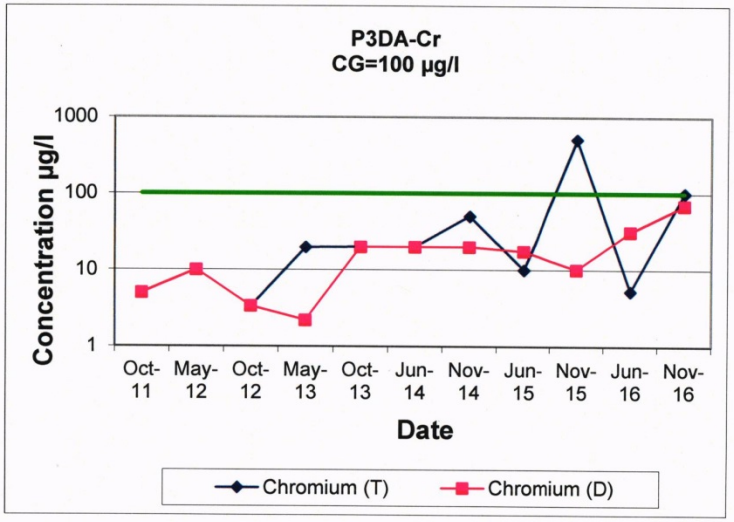

PWKA-Cr
CG=100 µg/l
Concentration µg/l
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Chromium (T)

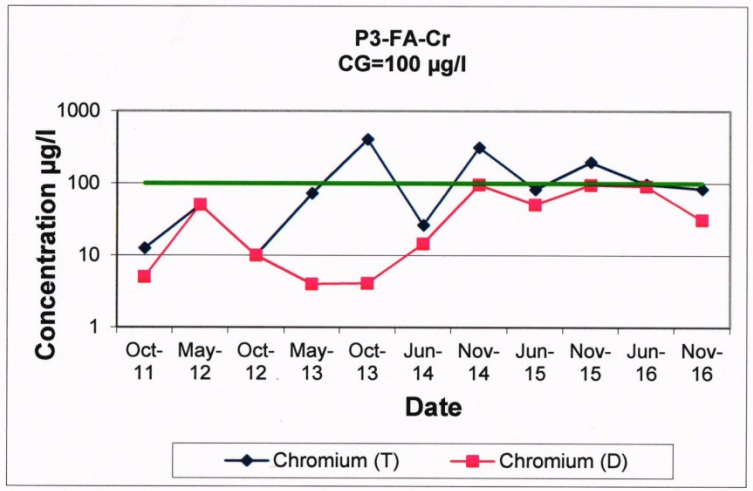

P2BA-Cr
CG=100 µg/l
Concentration µg/l
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Chromium (T)

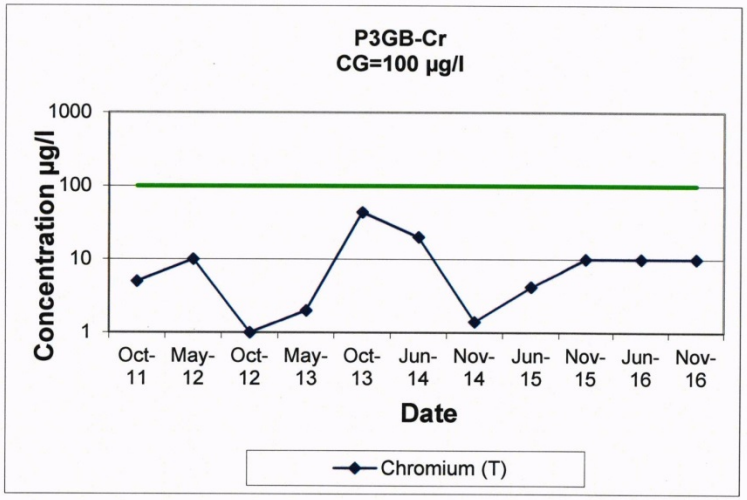

P2FA-Cr
CG=100 µg/l
Concentration µg/l
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Chromium (T)
Chromium (D)

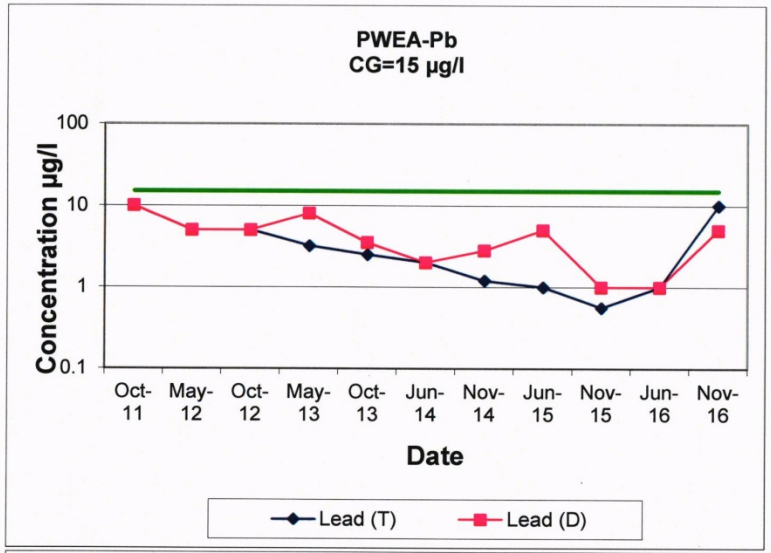

P2HA-Cr
CG=100 µg/l
Concentration µg/l
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-15
Nov-16
Date
Chromium (T)

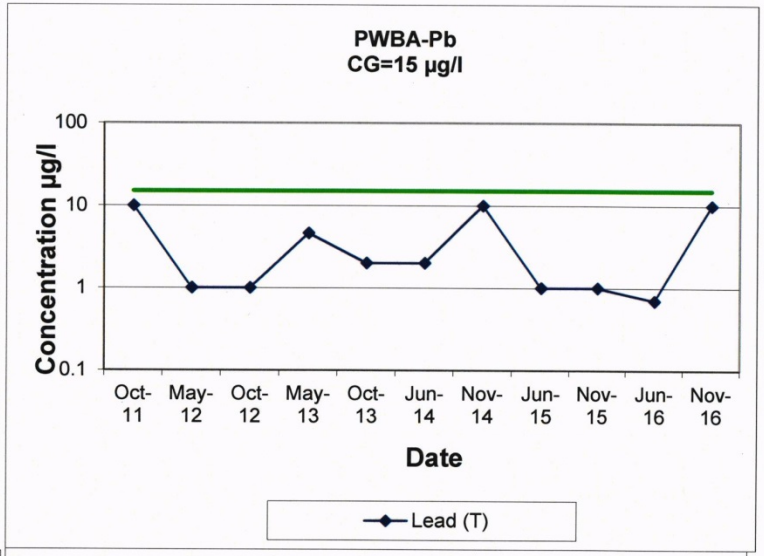

P3CC-Cr
CG=100 µg/l
Concentration µg/l
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Chromium (T)
Chromium (D)

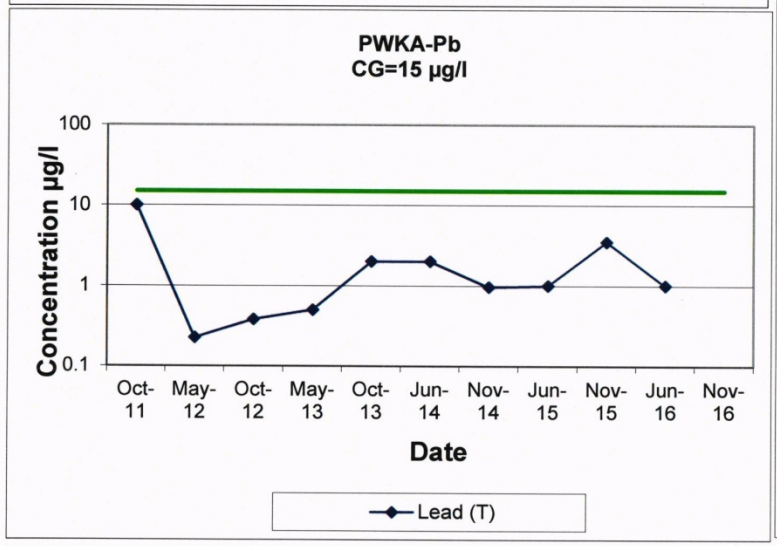

P3DA-Cr
CG=100 µg/l
Concentration µg/l
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Chromium (T)
Chromium (D)

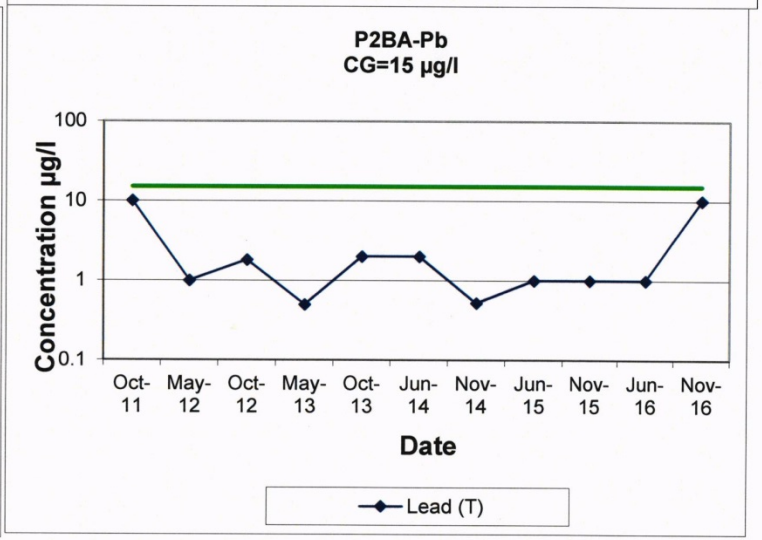

P3-FA-Cr
CG=100 µg/l
Concentration µg/l
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Chromium (T)
Chromium (D)

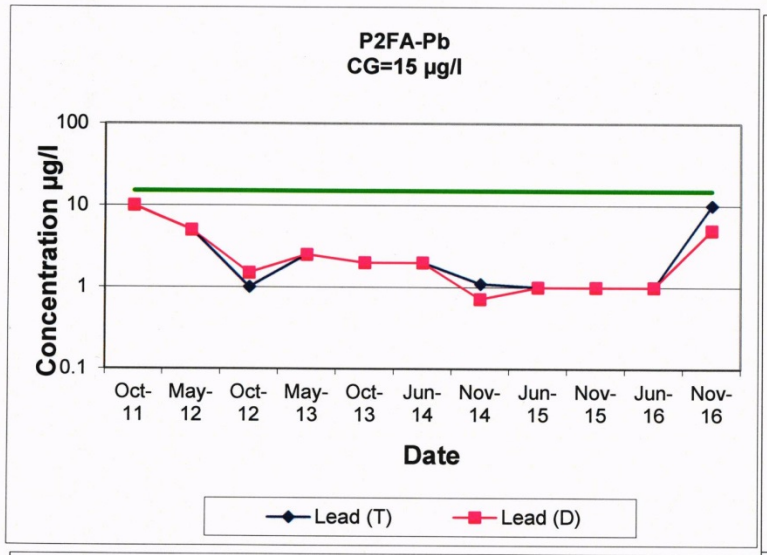

P3GB-Cr
CG=100 µg/l
Concentration µg/l
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Chromium (T)

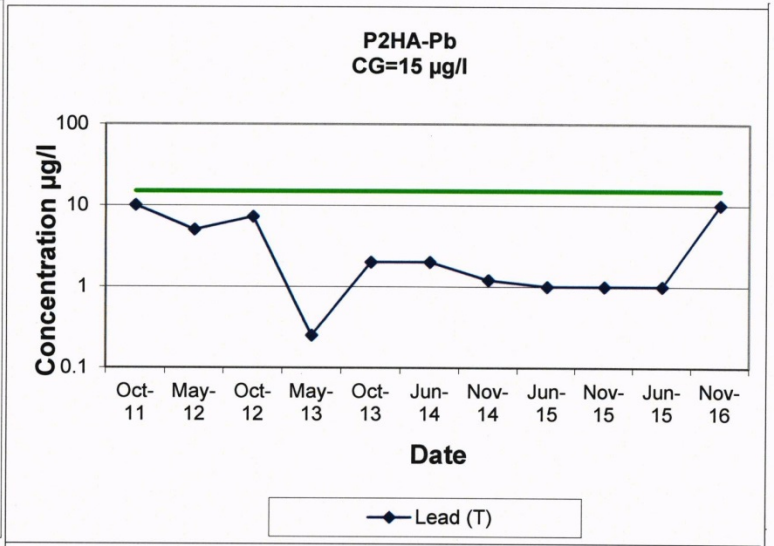

PWEA-Pb
CG=15 µg/l
Concentration µg/l
100
10
1
0.1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Lead (T)
Lead (D)

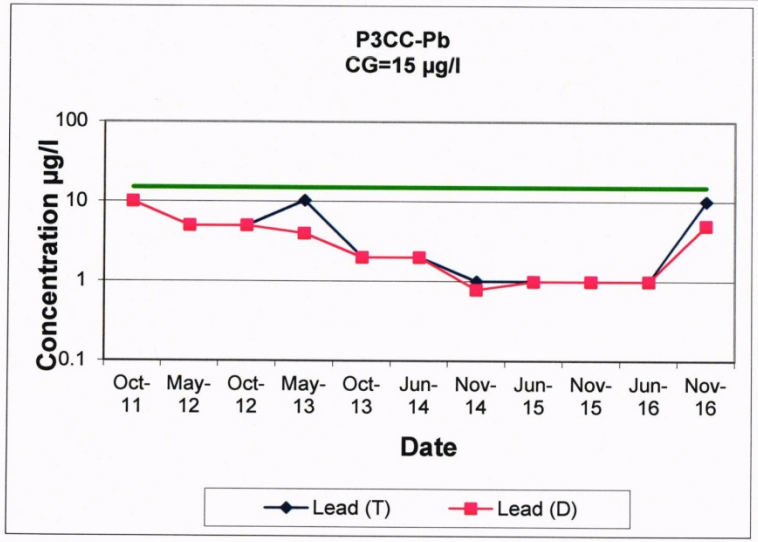

PWBA-Pb
CG=15 µg/l
Concentration µg/l
100
10
1
0.1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Lead (T)

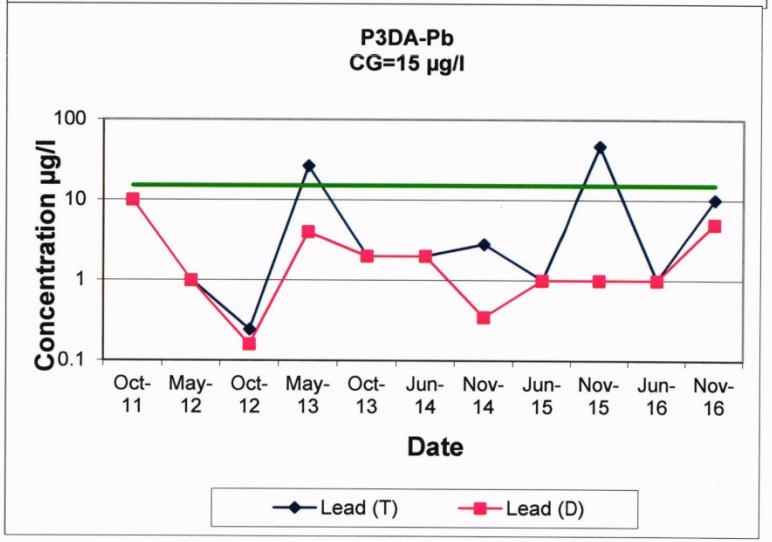

PWKA-Pb
CG=15 µg/l
Concentration µg/l
100
10
1
0.1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Lead (T)

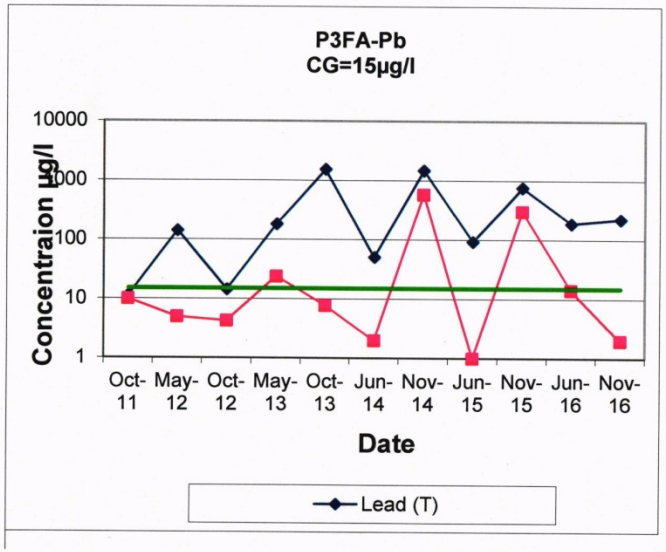

P2BA-Pb
CG=15 µg/l
Concentration µg/l
100
10
1
0.1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Lead (T)

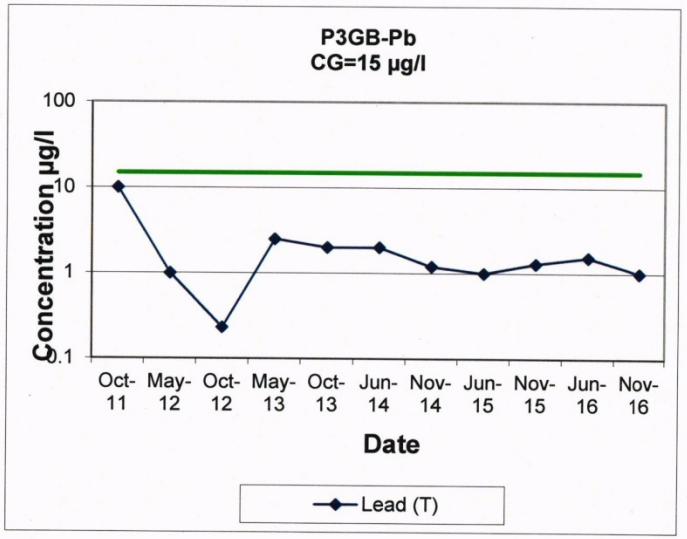

P2FA-Pb
CG=15 µg/l
Concentration µg/l
100
10
1
0.1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Lead (T)
Lead (D)

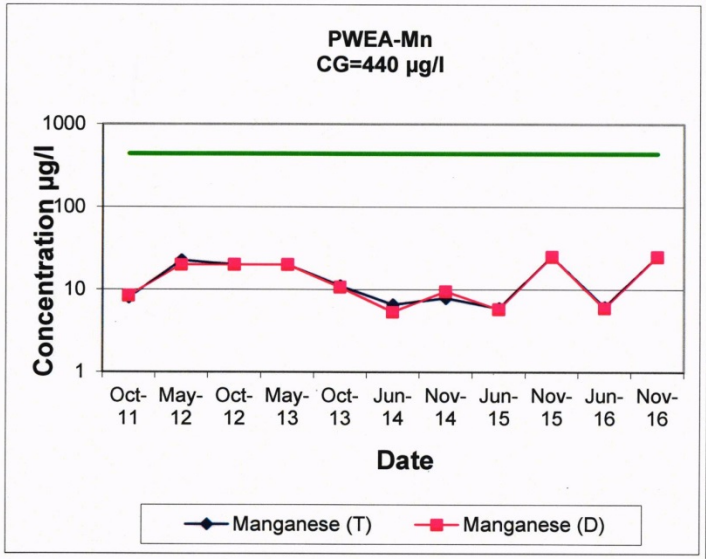

P2HA-Pb
CG=15 µg/l
Concentration µg/l
100
10
1
0.1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-15
Nov-16
Date
Lead (T)

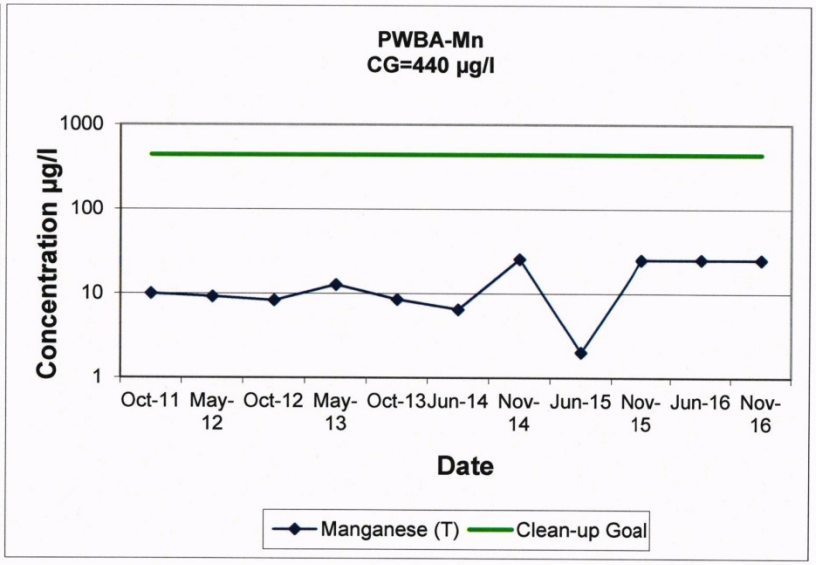

P3CC-Pb
CG=15 µg/l
Concentration µg/l
100
10
1
0.1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Lead (T)
Lead (D)

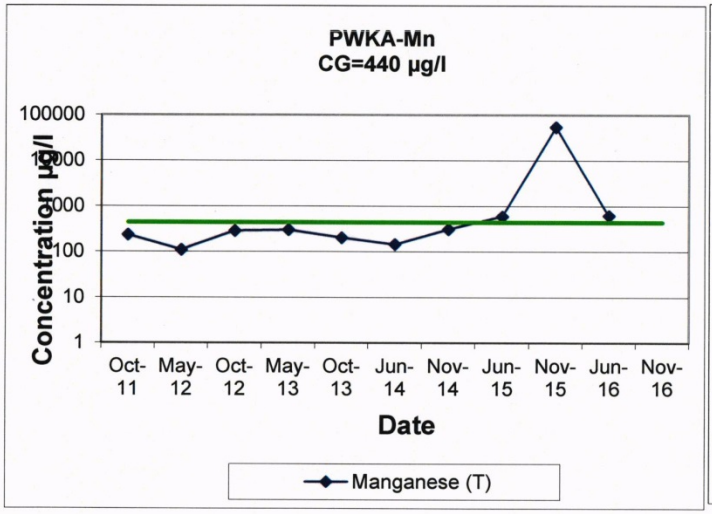

P3DA-Pb
CG=15 µg/l
Concentration µg/l
100
10
1
0.1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Lead (T)
Lead (D)

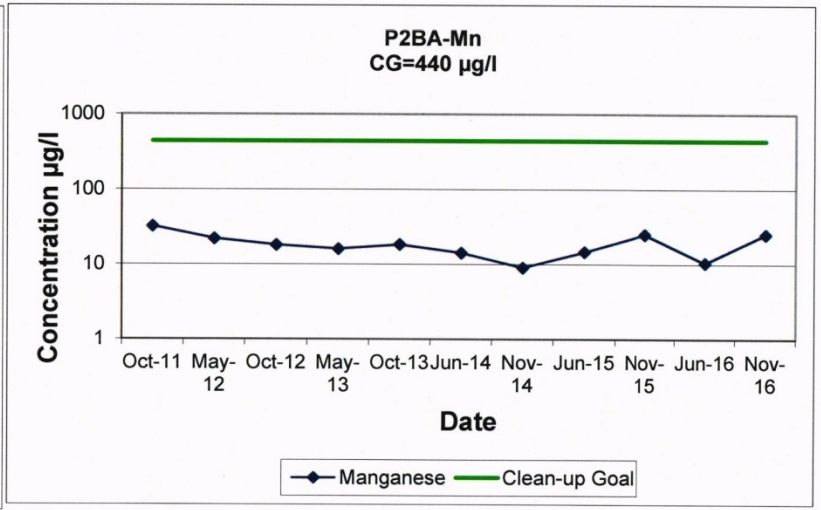

P3FA-Pb
CG=15µg/l
10000
1000
100
10
1
Concentraion µg/l
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Lead (T)

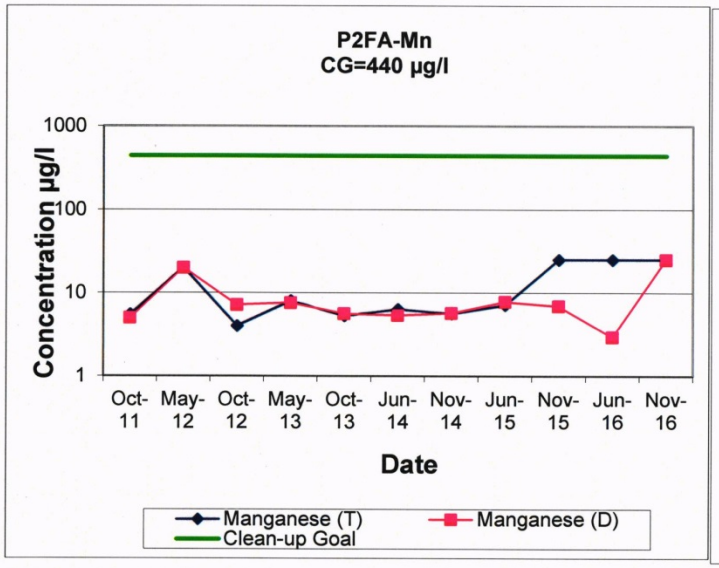

P3GB-Pb
CG=15 µg/l
100
10
1
0.1
Concentration µg/l
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Lead (T)

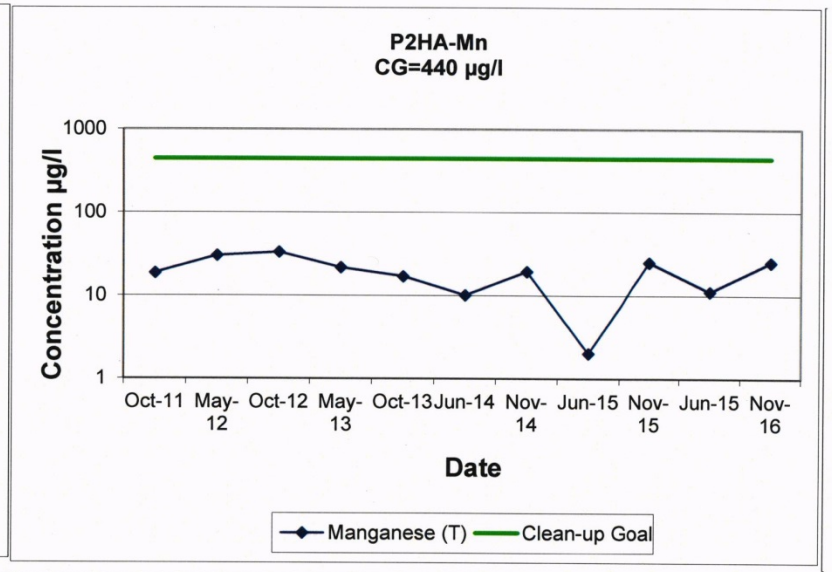

PWEA-Mn
CG=440 µg/l
Concentration µg/l
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Manganese (T)
Manganese (D)

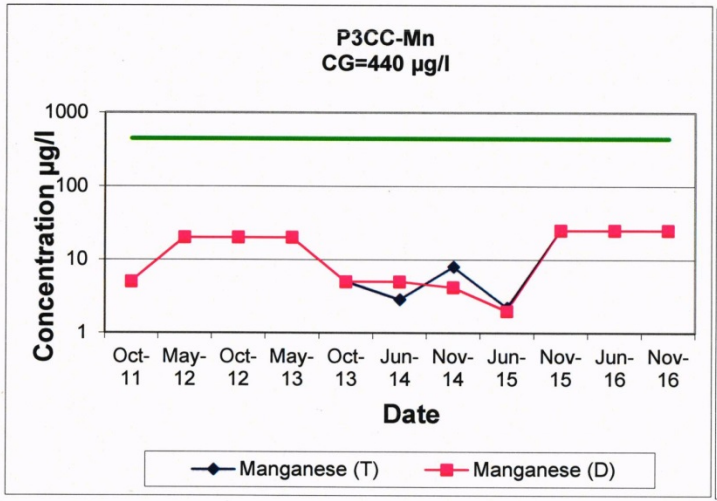

PWBA-Mn
CG=440 µg/l
Concentration µg/l
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Manganese (T)
Clean-up Goal

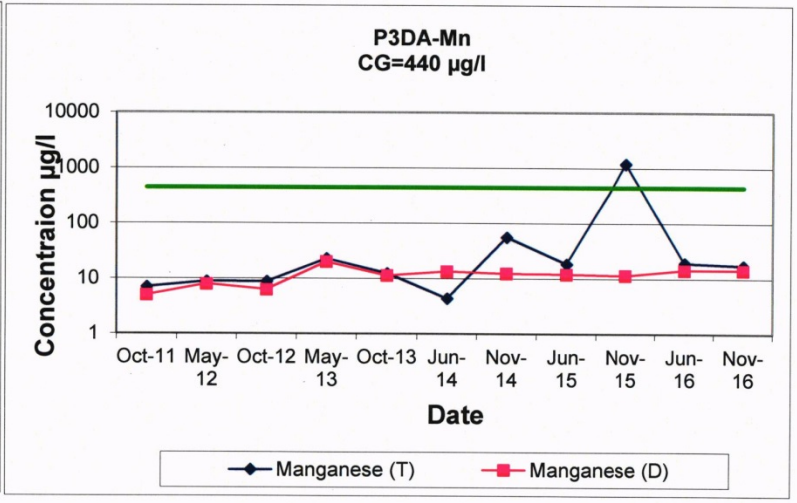

PWKA-Mn
CG=440 µg/l
Concentration µg/l
100000
10000
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Manganese (T)

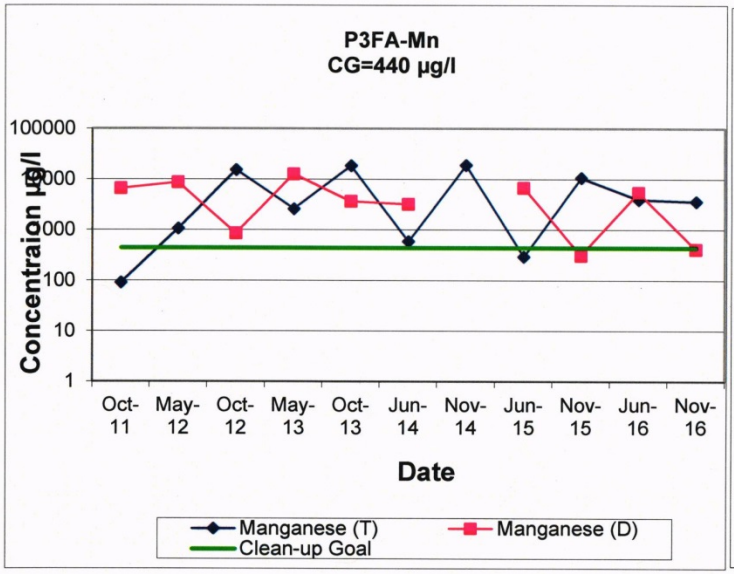

P2BA-Mn
CG=440 µg/l
Concentration µg/l
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Manganese
Clean-up Goal

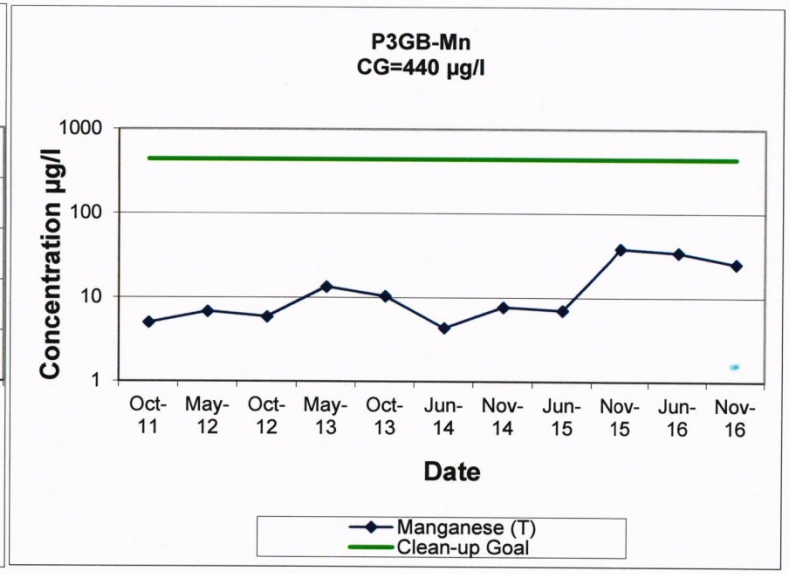

P2FA-Mn
CG=440 µg/l
Concentration µg/l
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Manganese (T)
Manganese (D)
Clean-up Goal

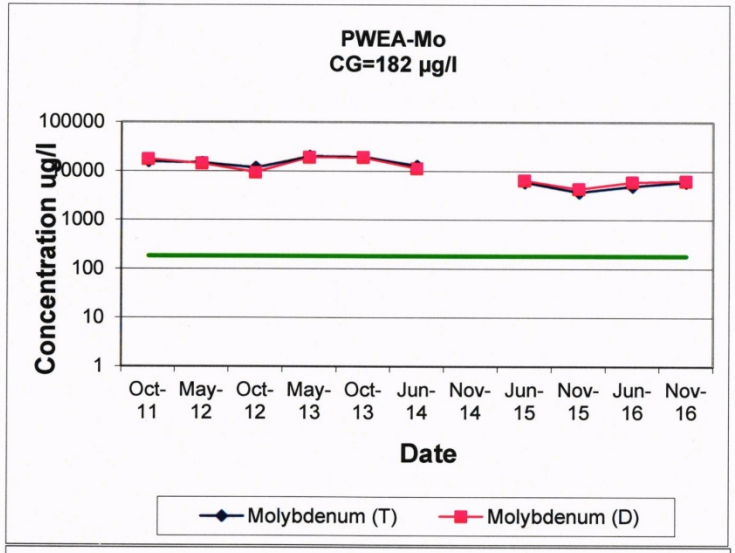

P2HA-Mn
CG=440 µg/l
Concentration µg/l
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-15
Nov-16
Date
Manganese (T)
Clean-up Goal

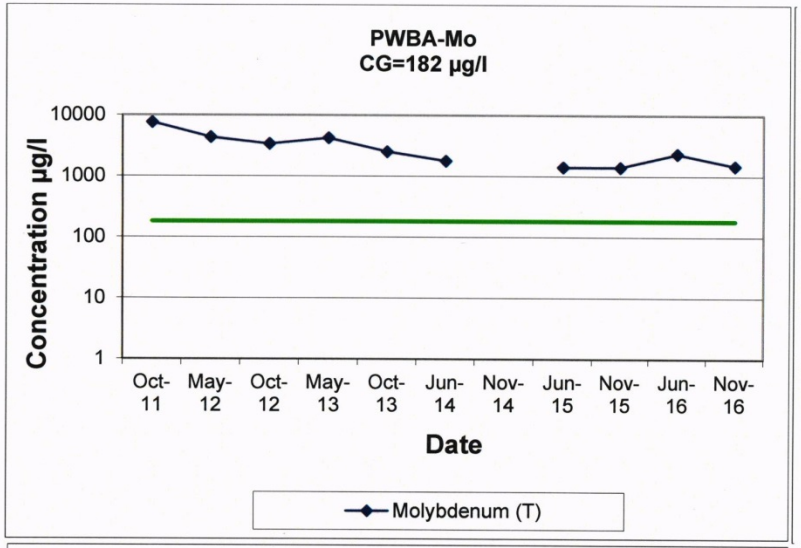

P3CC-Mn
CG=440 µg/l
Concentration µg/l
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Manganese (T)
Manganese (D)

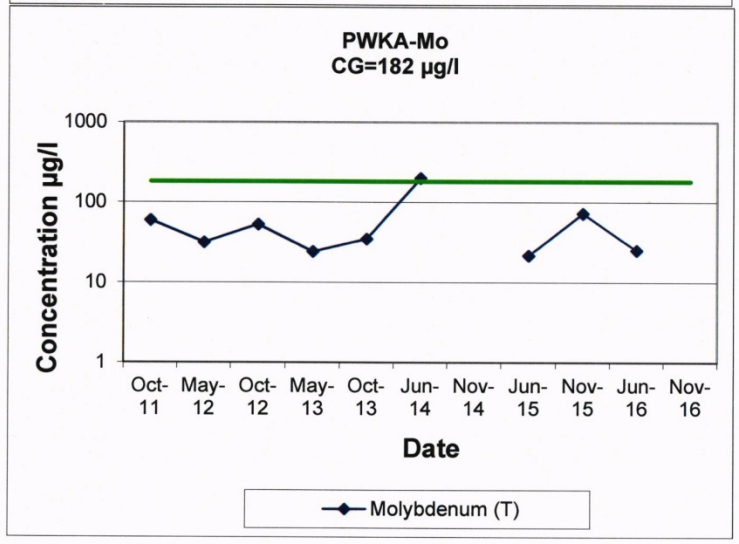

P3DA-Mn
CG=440 µg/l
Concentraion µg/l
10000
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Manganese (T)
Manganese (D)

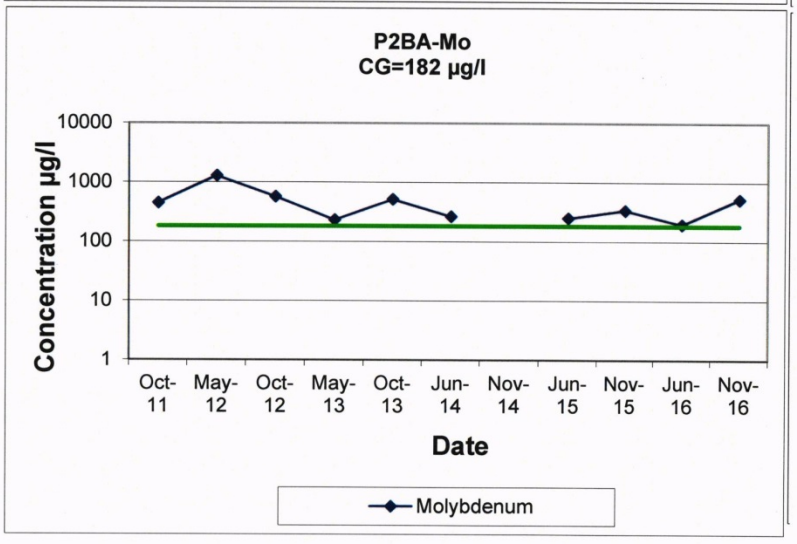

P3FA-Mn
CG=440 µg/l
Concentraion µg/l
100000
10000
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Manganese (T)
Manganese (D)
Clean-up Goal

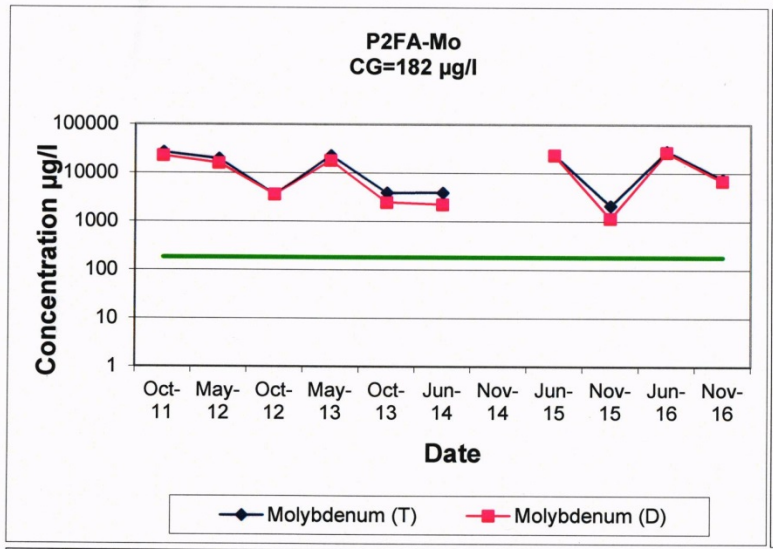

P3GB-Mn
CG=440 µg/l
Concentration µg/l
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Manganese (T)
Clean-up Goal

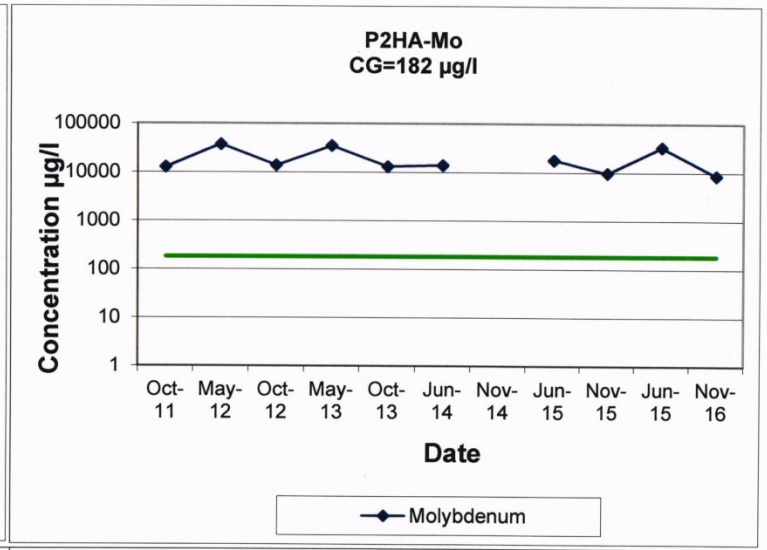

PWEA-Mo
CG=182 µg/l
Concentration µg/l
100000
10000
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Molybdenum (T)
Molybdenum (D)

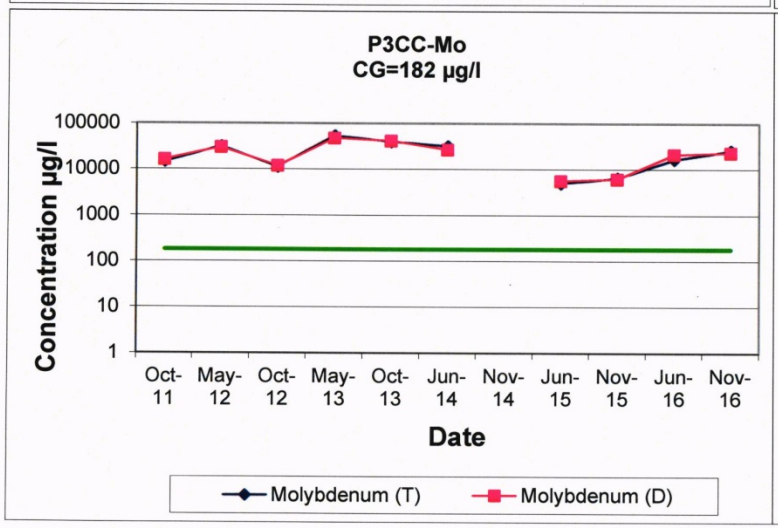

PWBA-Mo
CG=182 µg/l
Concentration µg/l
10000
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Molybdenum (T)

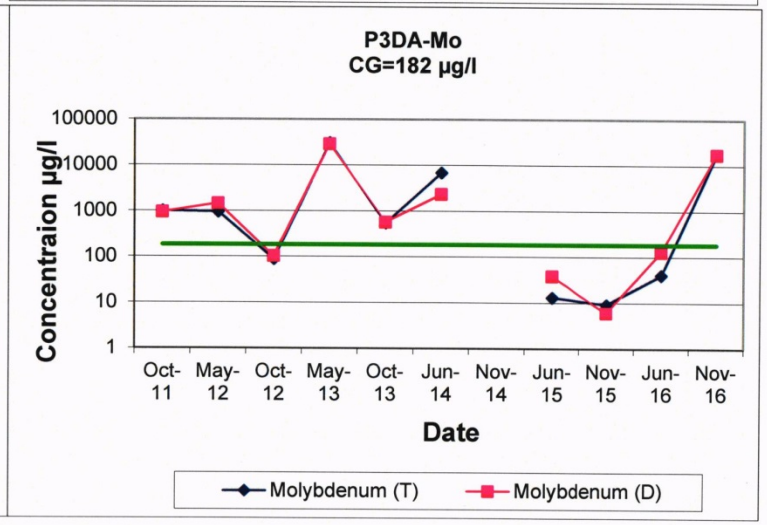

PWKA-Mo
CG=182 µg/l
Concentration µg/l
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Molybdenum (T)

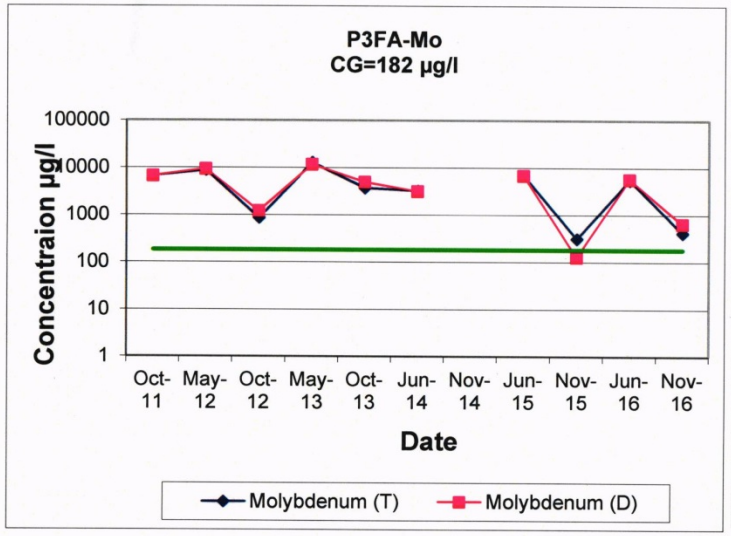

P2BA-Mo
CG=182 µg/l
Concentration µg/l
10000
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Molybdenum

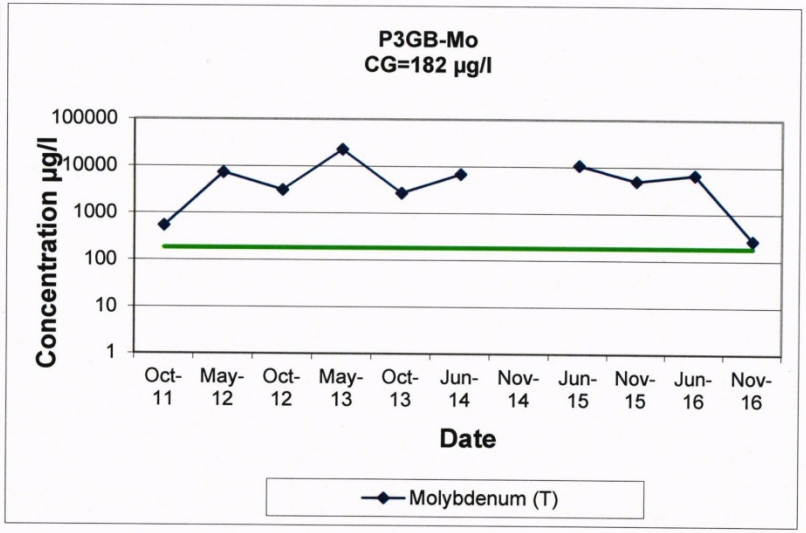

P2FA-Mo
CG=182 µg/l
Concentration µg/l
100000
10000
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Molybdenum (T)
Molybdenum (D)

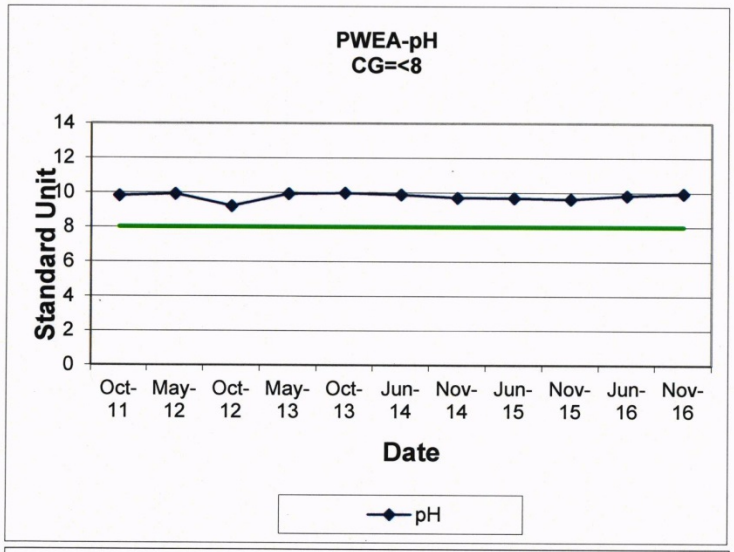

P2HA-Mo
CG=182 µg/l
Concentration µg/l
100000
10000
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-15
Nov-16
Date
Molybdenum

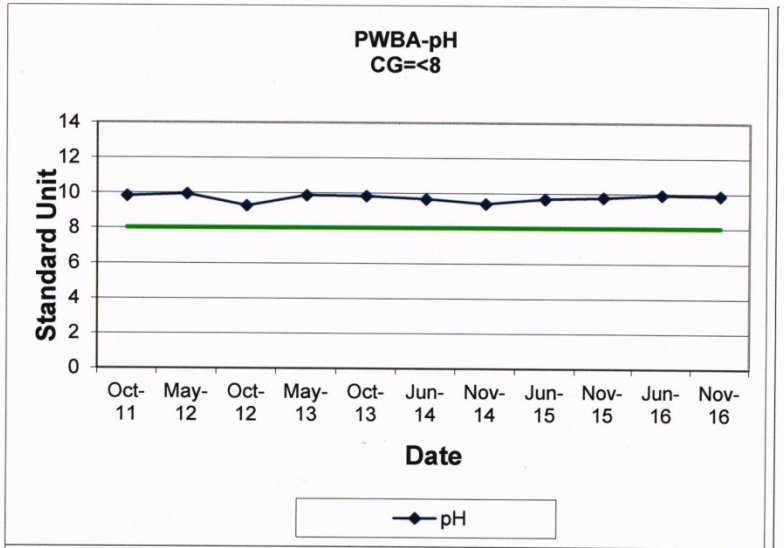

P3CC-Mo
CG=182 µg/l
Concentration µg/l
100000
10000
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Molybdenum (T)
Molybdenum (D)

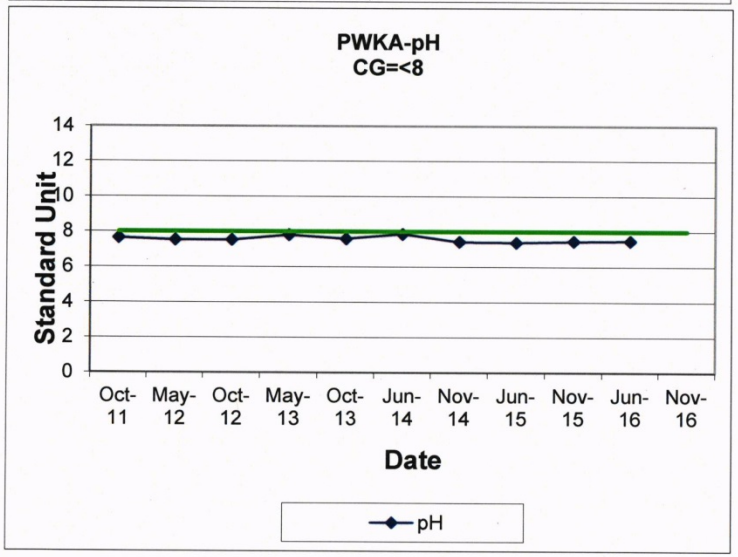

P3DA-Mo
CG=182 µg/l
Concentraion µg/l
100000
10000
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Molybdenum (T)
Molybdenum (D)

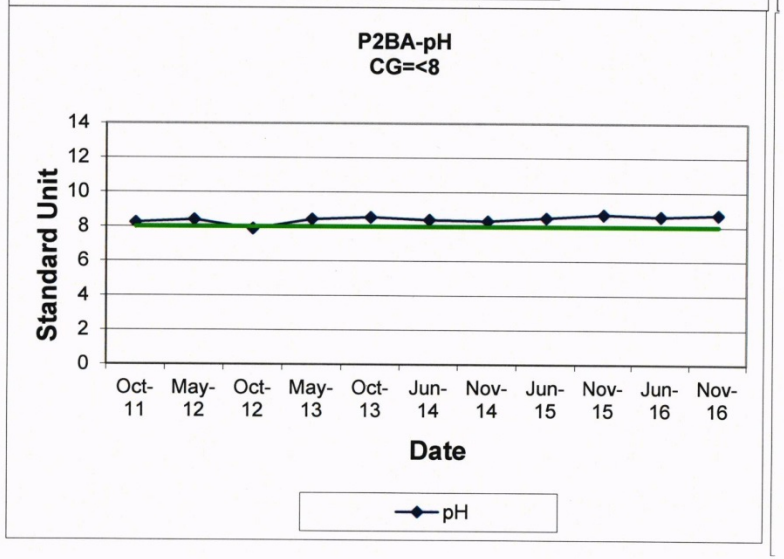

P3FA-Mo
CG=182 µg/l
Concentraion µg/l
100000
10000
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Molybdenum (T)
Molybdenum (D)

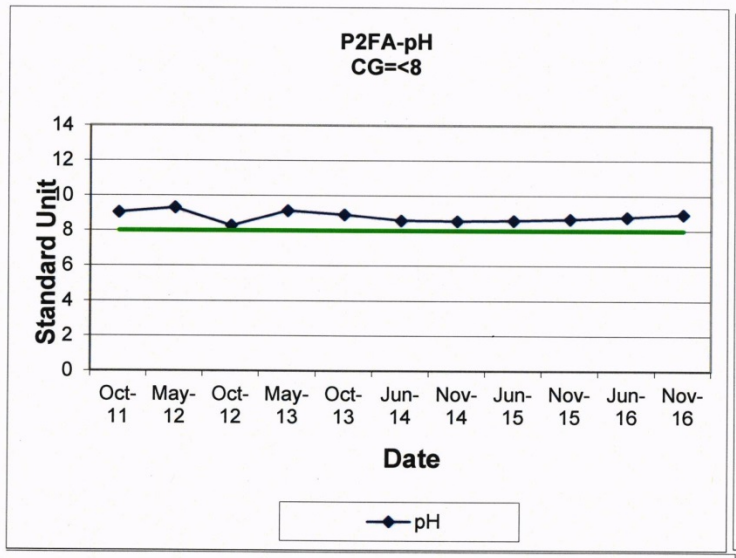

P3GB-Mo
CG=182 µg/l
Concentration µg/l
100000
10000
1000
100
10
1
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
Molybdenum (T)

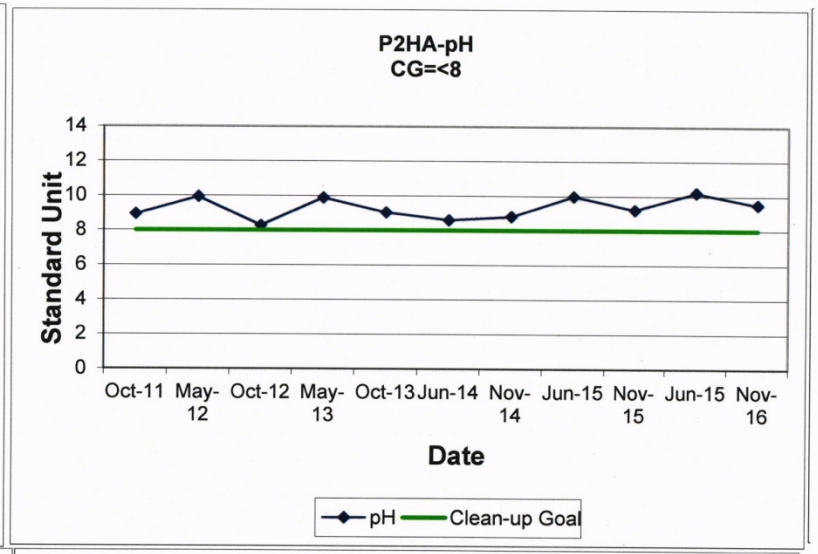

PWEA-pH
CG=<8
Standard Unit
14
12
10
8
6
4
2
0
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
pH

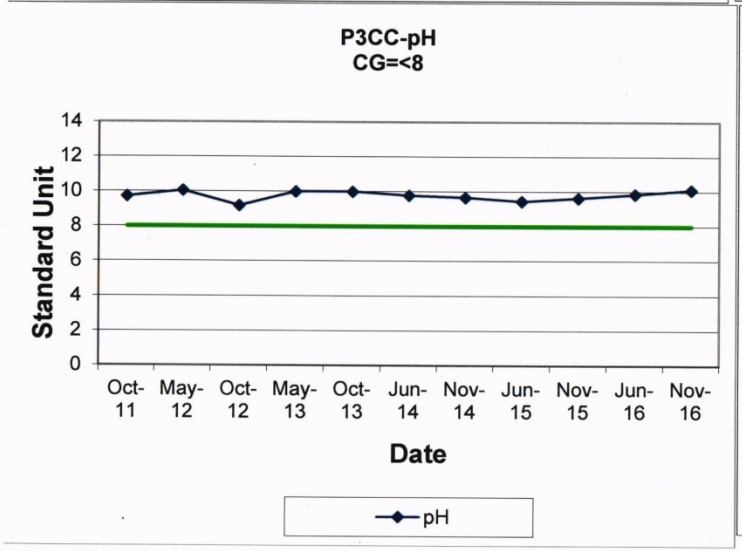

PWBA-pH
CG=<8
Standard Unit
14
12
10
8
6
4
2
0
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
pH

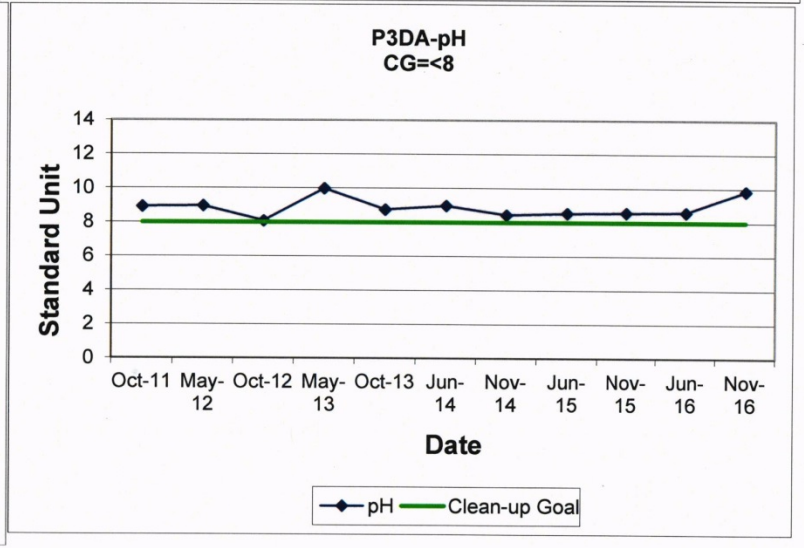

PWKA-pH
CG=<8
Standard Unit
14
12
10
8
6
4
2
0
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
pH

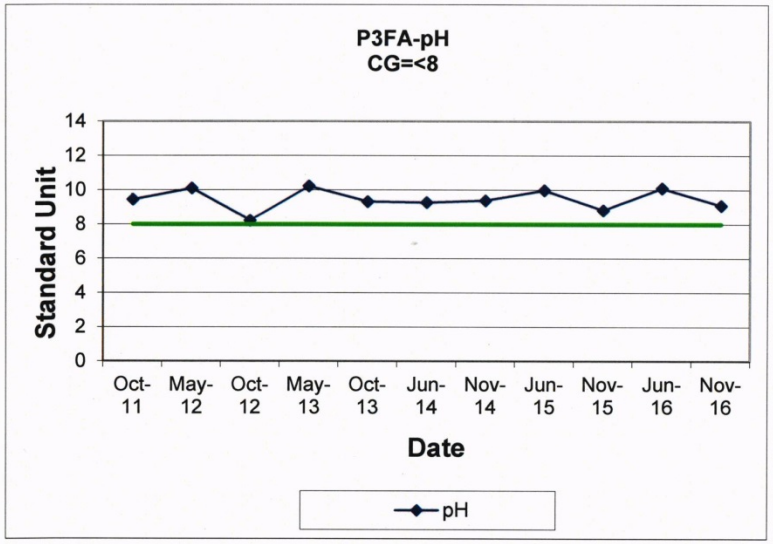

P2BA-pH
CG=<8
Standard Unit
14
12
10
8
6
4
2
0
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
pH

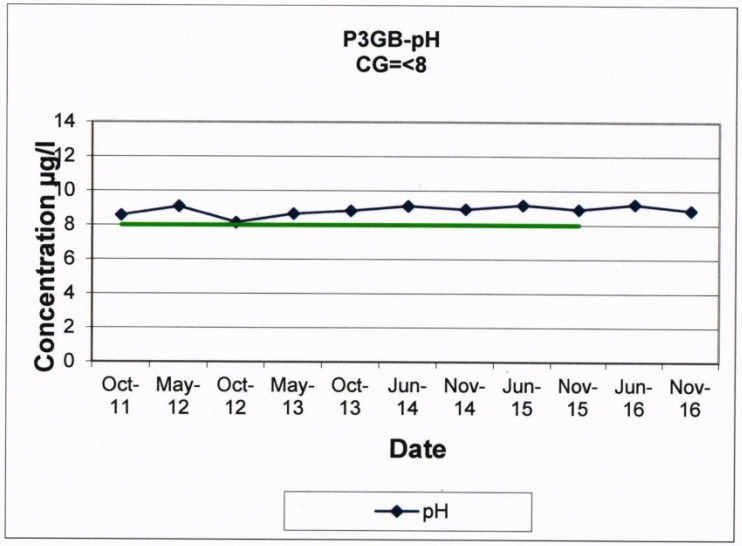

P2FA-pH
CG=<8
Standard Unit
0
2
4
6
8
10
12
14
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
pH


P2HA-pH
CG=<8
Standard Unit
0
2
4
6
8
10
12
14
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-15
Nov-16
Date
pH
Clean-up Goal

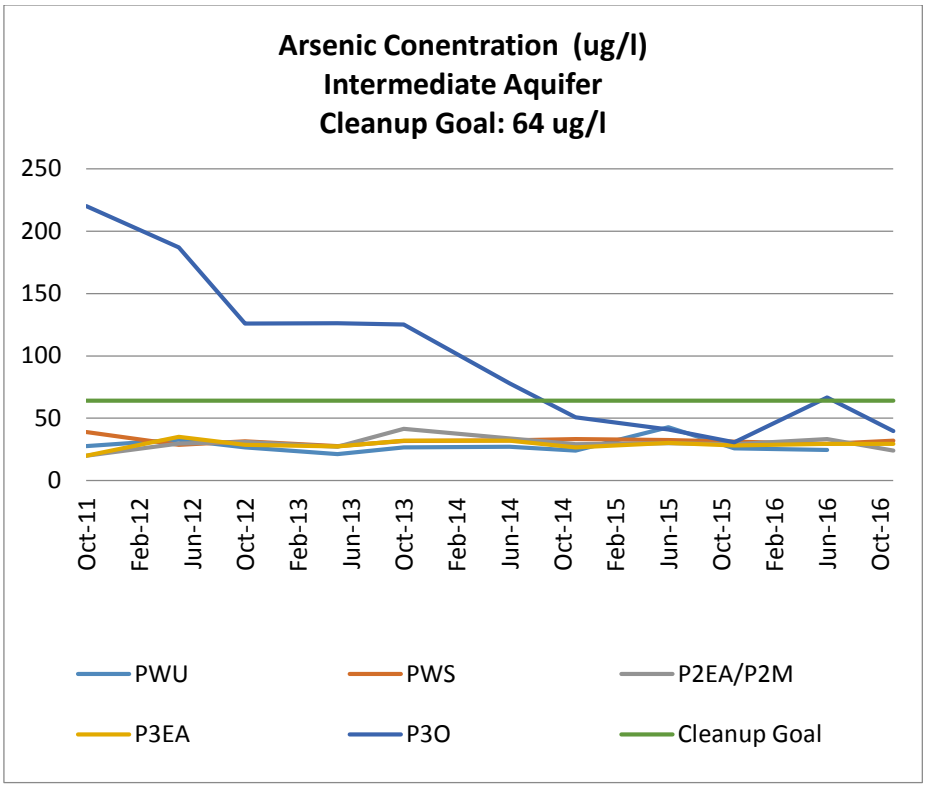

P3CC-pH
CG=<8
Standard Unit
0
2
4
6
8
10
12
14
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
pH

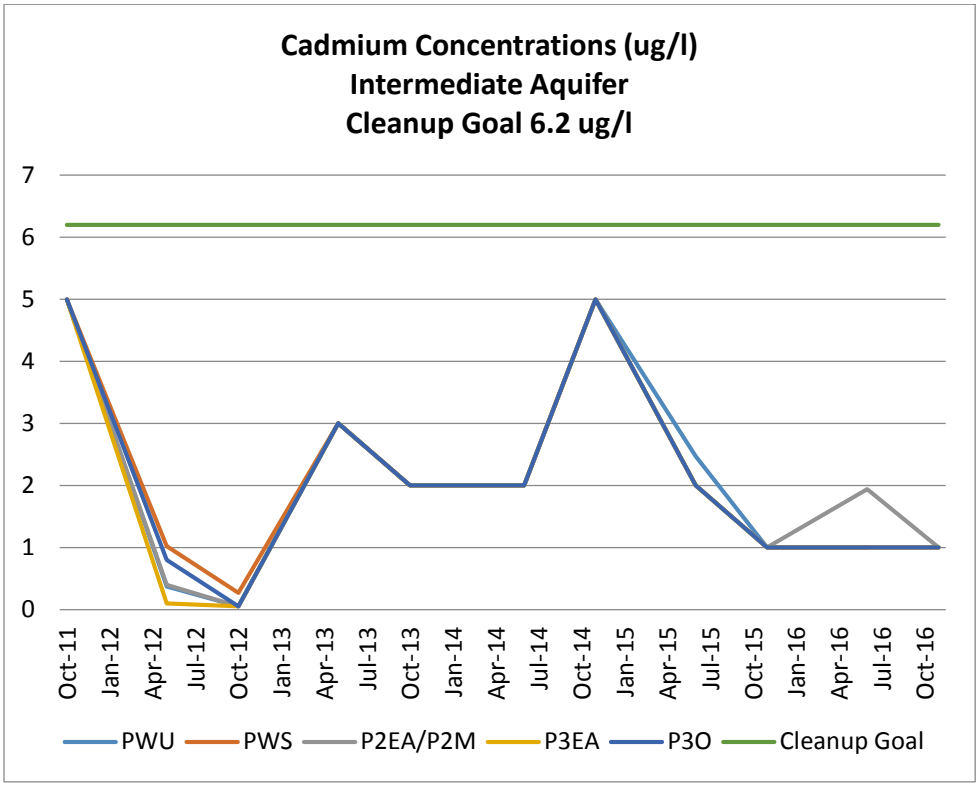

P3DA-pH
CG=<8
Standard Unit
0
2
4
6
8
10
12
14
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
pH
Clean-up Goal

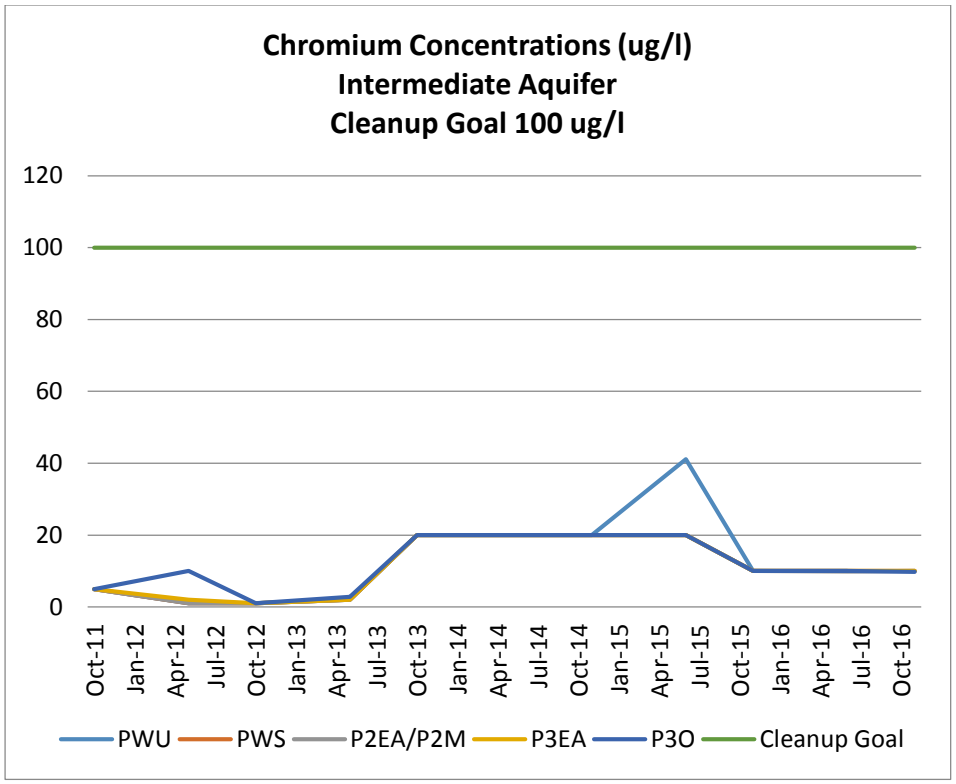

P3FA-pH
CG=<8
Standard Unit
14
12
10
8
6
4
2
0
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
pH

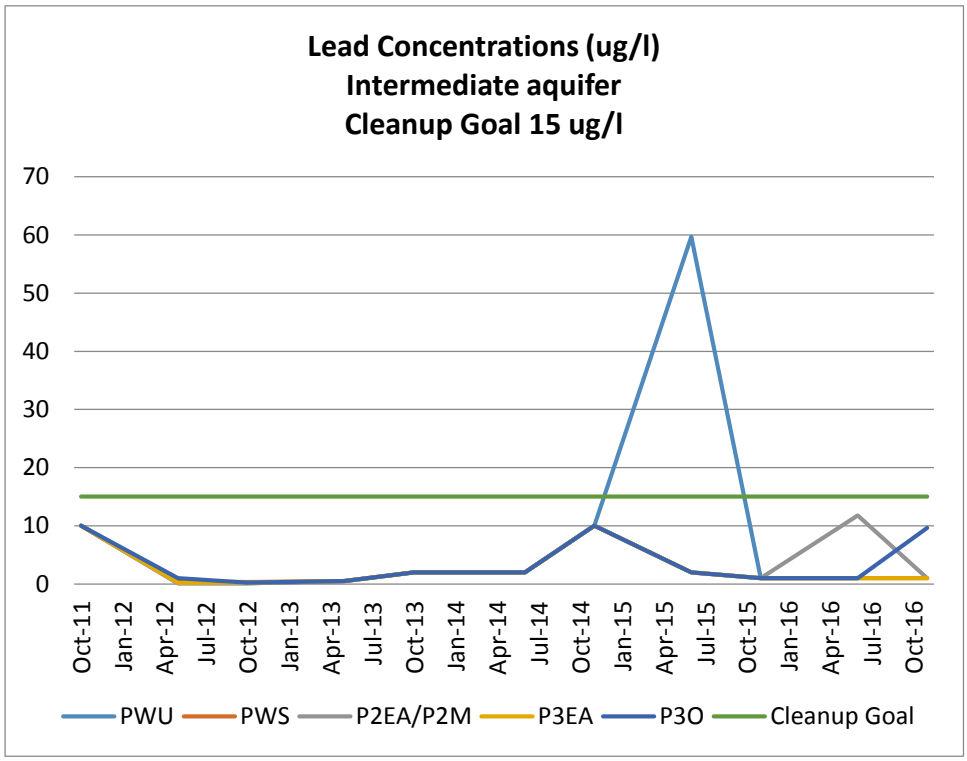

P3GB-pH
CG=<8
Concentration µg/l
14
12
10
8
6
4
2
0
Oct-11
May-12
Oct-12
May-13
Oct-13
Jun-14
Nov-14
Jun-15
Nov-15
Jun-16
Nov-16
Date
pH

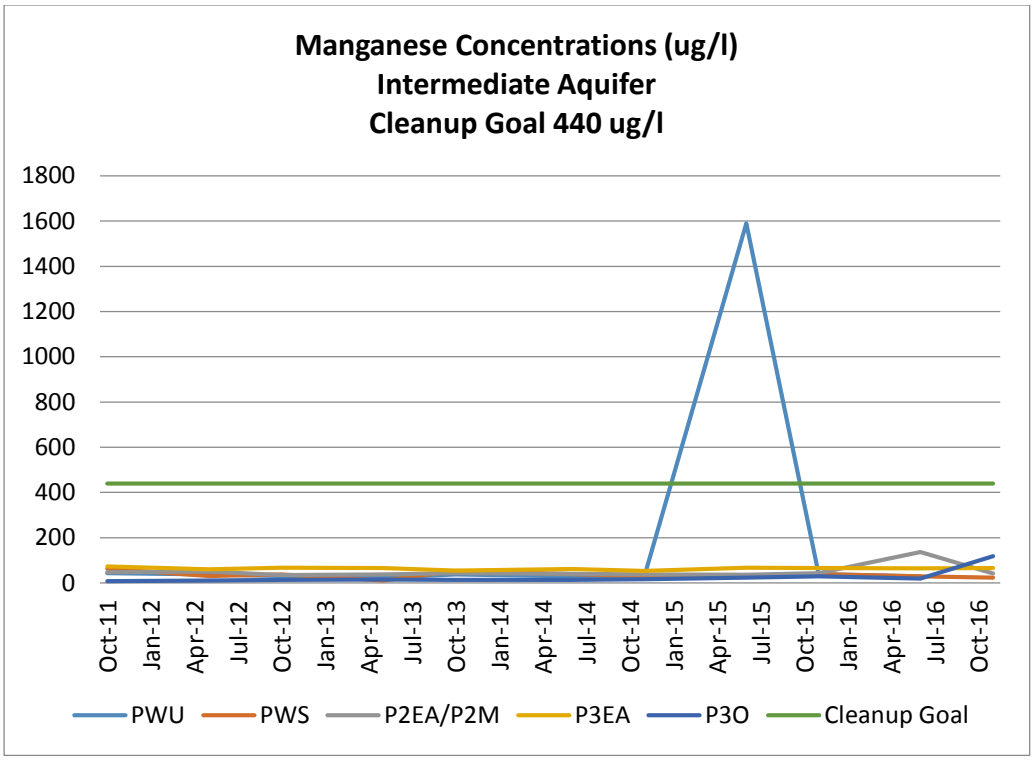
# APPENDIX C – INTERMEDIATE AQUIFER CONCENTRATION PLOTS

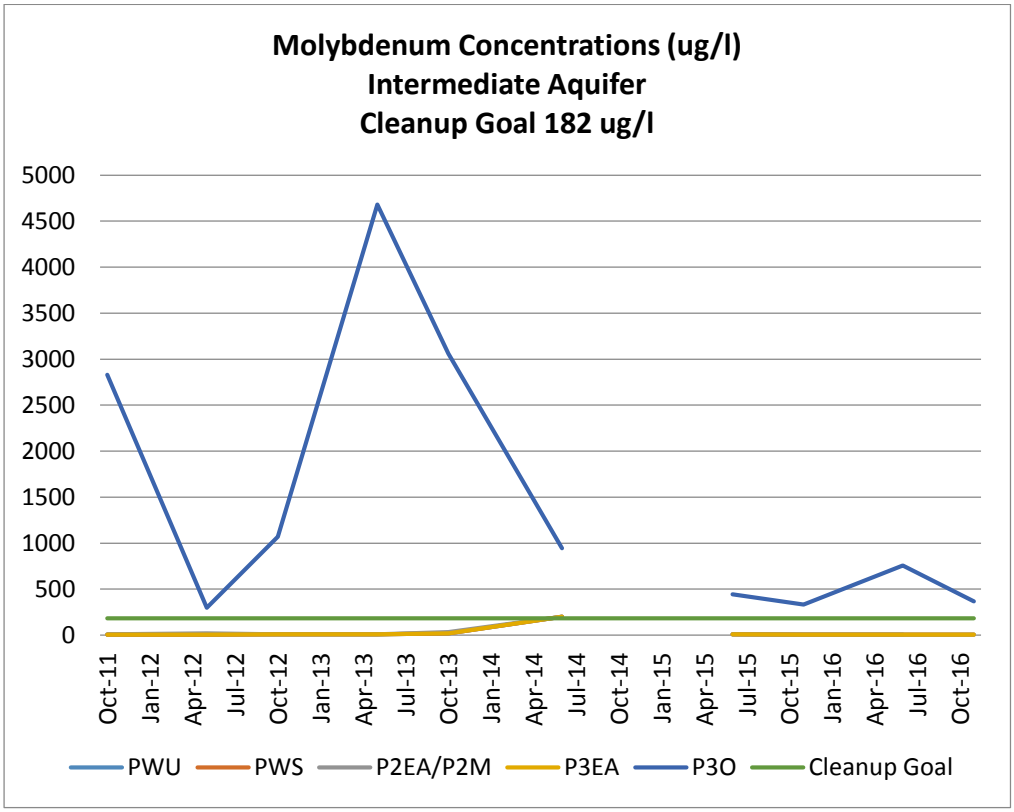

Arsenic Conentration (ug/l)
Intermediate Aquifer
Cleanup Goal: 64 ug/l
250
200
150
100
50
0
Oct-11
Feb-12
Jun-12
Oct-12
Feb-13
Jun-13
Oct-13
Feb-14
Jun-14
Oct-14
Feb-15
Jun-15
Oct-15
Feb-16
Jun-16
Oct-16
PWU
PWS
P2EA/P2M
P3EA
P3O
Cleanup Goal

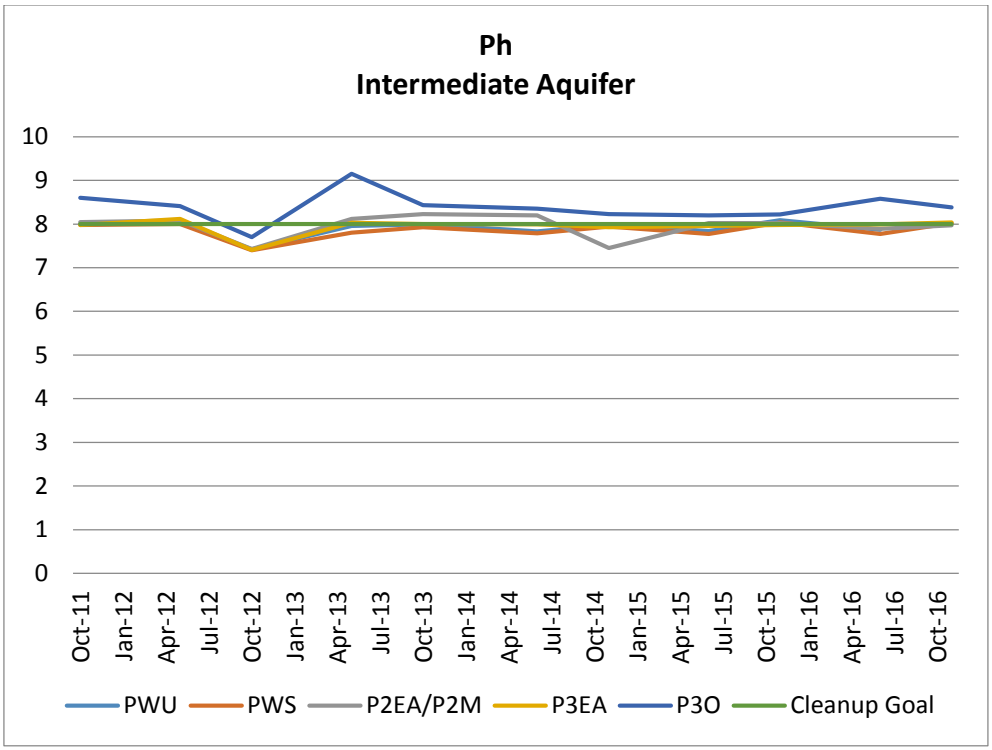

Cadmium Concentrations (ug/l)
Intermediate Aquifer
Cleanup Goal 6.2 ug/l
7
6
5
4
3
2
1
0
Oct-11
Jan-12
Apr-12
Jul-12
Oct-12
Jan-13
Apr-13
Jul-13
Oct-13
Jan-14
Apr-14
Jul-14
Oct-14
Jan-15
Apr-15
Jul-15
Oct-15
Jan-16
Apr-16
Jul-16
Oct-16
PWU
PWS
P2EA/P2M
P3EA
P3O
Cleanup Goal


Chromium Concentrations (ug/l)
Intermediate Aquifer
Cleanup Goal 100 ug/l
120
100
80
60
40
20
0
Oct-11
Jan-12
Apr-12
Jul-12
Oct-12
Jan-13
Apr-13
Jul-13
Oct-13
Jan-14
Apr-14
Jul-14
Oct-14
Jan-15
Apr-15
Jul-15
Oct-15
Jan-16
Apr-16
Jul-16
Oct-16
PWU
PWS
P2EA/P2M
P3EA
P3O
Cleanup Goal


Lead Concentrations (ug/l)
Intermediate aquifer
Cleanup Goal 15 ug/l
70
60
50
40
30
20
10
0
Oct-11
Jan-12
Apr-12
Jul-12
Oct-12
Jan-13
Apr-13
Jul-13
Oct-13
Jan-14
Apr-14
Jul-14
Oct-14
Jan-15
Apr-15
Jul-15
Oct-15
Jan-16
Apr-16
Jul-16
Oct-16
PWU
PWS
P2EA/P2M
P3EA
P3O
Cleanup Goal


Manganese Concentrations (ug/l)
Intermediate Aquifer
Cleanup Goal 440 ug/l
1800
1600
1400
1200
1000
800
600
400
200
0
Oct-11
Jan-12
Apr-12
Jul-12
Oct-12
Jan-13
Apr-13
Jul-13
Oct-13
Jan-14
Apr-14
Jul-14
Oct-14
Jan-15
Apr-15
Jul-15
Oct-15
Jan-16
Apr-16
Jul-16
Oct-16
PWU
PWS
P2EA/P2M
P3EA
P3O
Cleanup Goal


Molybdenum Concentrations (ug/l)
Intermediate Aquifer
Cleanup Goal 182 ug/l
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Oct-11
Jan-12
Apr-12
Jul-12
Oct-12
Jan-13
Apr-13
Jul-13
Oct-13
Jan-14
Apr-14
Jul-14
Oct-14
Jan-15
Apr-15
Jul-15
Oct-15
Jan-16
Apr-16
Jul-16
Oct-16
PWU
PWS
P2EA/P2M
P3EA
P3O
Cleanup Goal


Ph
Intermediate Aquifer
10
9
8
7
6
5
4
3
2
1
0
Oct-11
Jan-12
Apr-12
Jul-12
Oct-12
Jan-13
Apr-13
Jul-13
Oct-13
Jan-14
Apr-14
Jul-14
Oct-14
Jan-15
Apr-15
Jul-15
Oct-15
Jan-16
Apr-16
Jul-16
Oct-16
PWU
PWS
P2EA/P2M
P3EA
P3O
Cleanup Goal

# APPENDIX D – SURFACE WATER AND DISCHARGE WELL EXCEEDANCES

**October 2011**

| Surface Water | | | Discharge Wells | | |
|---|---|---|---|---|---|
| Analyte | Performance Standard µg/l | CDPOC µg/l | Analyte | ACL µg/l | P3FA |
| Total: | | | Total: | | |
| Aluminum | 181 | 247 | Aluminum | 4,502 | 9,297 |
| Copper | 11.3. | 19.0 | | | |
| Lead | 3.13 | 10.9 | | | |
| Selenium | 5.75 | 30.3 | | | |
| Dissolved: No Exceedences | | | Dissolved: No Exceedences | | |

**May 2012**

| Surface Water | | | Discharge Wells | | |
|---|---|---|---|---|---|
| Analyte | Performance Standard µg/l | CDPOC µg/l | Analyte | ACL µg/l | P3FA µg/l |
| Total: | | | Total: | | |
| Aluminum | 181 | 513 | Aluminum | 4,502 | |
| Copper | 11.3. | 16.0 | Silver | 6.21 | |
| Lead | 3.13 | 10.5 | | | |
| Dissolved: No exceedences | | | Dissolved: | | |
| | | | Silver | 2.00 | 7.00 |

**Ocotber 20112**

| Surface Water | | | Discharge Wells | | | | | |
|---|---|---|---|---|---|---|---|---|
| Analyte | Performance Standard µg/l | CDPOC µg/l | Analyte | ACL µg/l | P3FA µg/l | P3DA µg/l | PWEA µg/l | P2FA µg/l |
| Total: | | | Total: | | | | | |
| Aluminum | 181 | 255 | Iron | 25875 | 283,600 | 66,000 | 47,000 | 34,000 |
| Iron | 1,250 | 259,000 | | | | | | |
| Dissolved: No exceedences | | | Dissolved: No exceedences | | | | | |

**May 2013**

| Surface Water | | | Discharge Wells | | | | | |
|---|---|---|---|---|---|---|---|---|
| Analyte | Performance Standard µg/l | CDPOC µg/l | Analyte | ACL µg/l | P3FA µg/l | P3DA µg/l | P3CC µg/l | P2FA µg/l |
| Total: No exceedences | | | Total: | | | | | |
| | | | Aluminum | 4,502 | 52,492 | | | |
| | | | Iron | 25875 | 104,000.00 | | | |
| | | | Silver | 6.21 | | 40,000.00 | 19.70 | 7.10 |
| Dissolved: No Exceedences | | | Dissolved: No Exceedences | | | | | |

**October 2013**

| Surface Water | | | Discharge Wells | | |
|---|---|---|---|---|---|
| | Performance | | | | P3FA |
| Analyte | Standard µg/l | CDPOC µg/l | Analyte | ACL µg/l | µg/l |
| Total: No exceedences | | | Total: | | |
| | | | Aluminum | 4,502 | 410,140 |
| | | | Chromium 6 | 569 | 3,110.00 |
| | | | Copper | 1565 | 1,610.00 |
| | | | Iron | 25875 | 897,000.00 |
| | | | Lead | 667 | 1,541.00 |
| | | | Silver | 6.21 | 13.80 |
| Dissolved: No Exceedences | | | Dissolved: No Exceedences | | |

**June 2014**

| Surface Water | | | Discharge Wells | | |
|---|---|---|---|---|---|
| | Performance | | | | P3FA |
| Analyte | Standard µg/l | CDPOC µg/l | Analyte | ACL µg/l | µg/l |
| Total: | | | Total: | | |
| Aluminum | 181 | 368 | Chromium 6 | 569 | 3200 |
| Lead | 3.13 | 4.36 | Iron | 25875 | 28000 |
| Dissolved: No Exceedences | | | Dissolved: No Exceedences | | |

**November 2014**

| Surface Water | | | Discharge Wells | | |
|---|---|---|---|---|---|
| | Performance | | | | P3FA |
| Analyte | Standard µg/l | CDPOC µg/l | Analyte | ACL µg/l | µg/l |
| Total: | | | Total: | | |
| Iron | 1250 | **<2000** | Copper | 1565 | 2310 |
| | | | Iron | 25875 | 472000 |
| | | | Lead | 667 | 1480 |
| | | | Mercury | 0.62 | 2.4 |
| Dissolved: | | | Dissolved: | | |
| Iron | 1250 | **<2000** | Iron | 25875 | 185000 |
| | | | Mercury | 0.62 | 1.2 |

**June 2015**

| Surface Water | | | Discharge Wells | | |
|---|---|---|---|---|---|
| | Performance | | | | P3FA |
| Analyte | Standard µg/l | CDPOC µg/l | Analyte | ACL µg/l | µg/l |
| Total: No exceedences | | | Total: | | |
| | | | Iron | 25875 | 103000 |
| Dissolved: No Exceedences | | | Dissolved: No Exceedences | | |

**November 2015**

| Surface Water | | | Discharge Wells | | | |
|---|---|---|---|---|---|---|
| Analyte | Performance Standard µg/l | Measured Exceedence µg/l | Analyte | ACL µg/l | P3FA Exceedence µg/l | P3DA Exceedence µg/l |
| Total: No exceedences | | | Total: | | | |
| | | | Aluminum | 4,502 | 225000 | 30000 |
| | | | Iron | 25875 | 386000 | 46600 |
| | | | Silver | | 6.22 | |
| Dissolved: No Exceedences | | | Dissolved: | | | |
| | | | Aluminum | 4,502 | 46200 | |
| | | | Iron | 25875 | 120000 | |

**June 2016**

| Surface Water | | | Discharge Wells | | |
|---|---|---|---|---|---|
| Analyte | Performance Standard µg/l | Measured Exceedence µg/l | Analyte | ACL µg/l | P3FA Exceedence µg/l |
| Total: No exceedences | | | Total: | | |
| | | | Aluminum | 4,502 | 99300 |
| | | | Iron | 25875 | 148000 |
| Dissolved: No Exceedences | | | Dissolved: No Exceedences | | |

**November 2016**

| Surface Water | | | Discharge Wells | | |
|---|---|---|---|---|---|
| Analyte | Performance Standard µg/l | Measured Exceedence µg/l | Analyte | ACL µg/l | P3FA Exceedence µg/l |
| Total: | | | Total: | | |
| Aluminum | 181 | 203 | Aluminum | 4,502 | 81600 |
| Lead | 3.13 | 9.56 | Iron | 25875 | 137000 |

µg/l Micrograms per liter

< Measurement is below detection limit

** No value established

ACL Alternate Concentration Limit

# APPENDIX E – COMMUNITY INVOLVEMENT

# PUBLIC NOTICE

**Five-Year Review Planned for Portland Cement Superfund Site**

**Salt Lake County**

The Utah Department of Environmental Quality, Division of Environmental Response and Remediation (UDEQ/DERR)—in cooperation with the U.S. Environmental Protection Agency (EPA)—is currently conducting a Five-Year Review at the Portland Cement (Kiln Dust #2 & #3) Superfund Site. The purpose of the Five-Year Review is to determine whether the remedy at the site is protective of human health and the environment.

The Portland Cement Site is 71 acres of land near 100 South Redwood Road in Salt Lake City, Utah. Approximately 825,000 tons of Cement Kiln Dust (CKD) and contaminated soil were excavated and removed off site for proper disposal. The site was backfilled with clean soil, re-graded, and seeded. Restrictions on future property use were imposed to protect the soil cover. The UDEQ and EPA agreed on the use of monitored natural attenuation as the most appropriate method for addressing groundwater contamination. Long-term monitoring and administrative restrictions on the use of site ground water ensure that public health and the environment are protected until the ground water is clean.

During this Five-Year Review, UDEQ/DERR will review the current site information, conduct a site inspection, and prepare a report. The Five-Year Review completed in 2012 indicated the remedy at Portland Cement was protective of human health and the environment. The planned completion date of this Five-Year Review is September 2017.

**CONTACTS:**

If you would like more information about the review or would like to participate in an interview, please contact:


**Thomas Daniels**
UDEQ Project Manager
Phone: (801) 536-4090
Email: tdaniels@utah.gov

**Dave Allison**
UDEQ Community Involvement
Phone: (801) 536-4479
Email: dallison@utah.gov

**Portland Cement (Kiln Dust 2 & 3) Superfund Site**
**Five-Year Review Community Interview**

| | |
|---|---|
| Site Name: Portland Cement (Kiln Dust 2 & 3) Superfund Site | Date: August 3, 2017 |
| Type of Contact: Visit | Contact Made By: Dave Allison, UDEQ – DERR Community Involvement Coordinator and Thomas Daniels, UDEQ-DERR Project Manager |
| **Person Contacted** | |
| **Name:** Laura Briefer, Director for Salt Lake City Department of Public Utilities<br>Marian Rice, Water Quality & Treatment Administrator at Salt Lake City Corporation<br>Rusty Vetter, Deputy *City* Attorney | **Organization:** Salt Lake City Public Utilities |
| Address: 1530 South West Temple<br>Salt Lake City, Utah 84115 | Telephone Number: (801) 483-6700 |

1. **Are you aware of the Portland Cement Superfund site and the work that was completed to address environmental contamination?** The Salt Lake City Department of Public Utilities (SLCDPU) staff works with the engineering and construction services for Salt Lake City on infrastructure projects. The 71-acre Portland Cement site is in a commercial and industrial zone located on the west side of Salt Lake City and the staff is knowledgeable of site history through their utility and sewer projects.

2. **Are there any concerns or issues regarding the Portland Cement Superfund Site?** The SLCDPU Staff did not have any overall site concerns and did have one incident within the last five year period. A SLCDPU dewatering project in 2016 was coordinated by a different UDEQ Division rather the DERR. UDEQ's Division of Water Quality provided guidance to the SLCDPU staff not knowing the dewatering work to a surface impoundment was occurring on cleanup property with environmental easements. The miscommunication didn't compromise the protectiveness of the remedy yet identified an information gap regarding the location as a former Superfund site. The SLCDPU suggested sending a memo to DERR on any future utility or sewer projects and work with other departments to see what else could be done to improve awareness of this issue.

3. **Are you aware of any community concerns regarding the Portland Cement Site and its administration? If so, please give details.** With the site in an Operations and Maintenance phase and already cleaned up, the SLCDPU staff have not any reported businesses or community issues regarding the site. The area is an industrial park with daily operating businesses. The SLCDPU does not issue permits and only works with the Building Services to get permits for their projects. The SLCDPU Staff was aware through DERR that monitoring wells were damaged by construction contractors in past years at the Portland cement site. The SLCDPU staff offered assistance and to work with DERR to coordinate information or maps regarding site related permits and construction projects within Salt Lake City.

4. **Do you feel well informed about the site's activities and progress over the last five years? Do you know how to contact the Environmental Protection Agency if you have questions or concerns about the Portland Cement Superfund Site?** The SLCDPU Staff has had regular communication with DERR project managers on cleanup sites within Salt Lake City and contact UDEQ or EPA as necessary.

5. **Do you have any additional comments, suggestions, or recommendations regarding the Portland Cement Superfund Site?** The SLCDPU Staff suggested DERR speak to the City Building Services Office to determine the detail of information regarding the environment easement information. SLCDPU Staff would also speak internally to Business Services to begin a dialogue preventing monitoring wells from being damaged in the future.

**Portland Cement (Kiln Dust 2 & 3) Superfund Site**
**Five-Year Review Community Interview**

| | |
|---|---|
| Site Name: Portland Cement (Kiln Dust 2 & 3) Superfund Site | Date: August 8, 2017 |
| Type of Contact: Visit | Contact Made By: Dave Allison, UDEQ – DERR Community Involvement Coordinator |
| **Person Contacted** | |
| **Name:** Adam Gerlach | **Organization:** Wallace Stegner Academy |
| Address: 980 South Bending Road<br>Salt Lake City, Utah 84104 | Telephone Number: (801) 456-9570 |

1. **Are you aware of the Portland Cement Superfund site and the work that was completed to address environmental contamination?** Adam Gerlach is the Director of the Wallace Stegner Academy charter school that serves students in kindergarten through 8th grade. Built in 2016 on the Portland Cement site, Gerlach had no knowledge of the cleanup site history despite some involvement with construction meetings where seismic studies and stability were discussed.

2. **Are there any concerns or issues regarding the Portland Cement Superfund Site?** Not knowing the area was a former Superfund cleanup site; Gerlach said the building process from construction to completion never presented any health or environmental problems to consider. If the site was cleaned up, Gerlach said they lease the property and any potential problems for the location would have been addressed by the property owner. As the Glendale area is somewhat landlocked, Gerlach said the commercial/industrial location for the school was the closest opportunity, has worked out well, and filled a need in the community.

3. **Are you aware of any community concerns regarding the Portland Cement Site and its administration? If so, please give details.** Gerlach has not had any parents having concerns or issues with the school or anyone ever mentioning the property as a former Superfund site. There is a waiting list to get into Wallace with a lottery in place to accommodate demand.

4. **Do you feel well informed about the site's activities and progress over the last five years? Do you know how to contact the Environmental Protection Agency if you have questions or concerns about the Portland Cement Superfund Site?** As Gerlach wasn't aware of the site history he would not have known whom to contact and was provided with the UDEQ contacts for the site. A sampling well is located to the west of the school in a fenced area of the playground. Told of environmental easements requiring access for annual sampling, Gerlach didn't know what the well was or its purpose and provided the gate code for any sampling. Gerlach wants to cooperate fully, appreciates the information, and would help out where he could schedule any sampling at the well site.
5. **Do you have any additional comments, suggestions, or recommendations regarding the Portland Cement Superfund Site?** Gerlach did not have comments other than possibly speaking to the school contractors at West One.

**Portland Cement (Kiln Dust 2 & 3) Superfund Site**
**Five-Year Review Community Interview**

| | |
|---|---|
| Site Name: Portland Cement (Kiln Dust 2 & 3) Superfund Site | Date: July 10, 2017 |
| Type of Contact: Visit | Contact Made By: Dave Allison and Thomas Daniels, UDEQ. |
| **Person Contacted** | |
| Name: Teresa Gray, Bureau Manager Water Quality and Hazardous Waste, Dan Moore, Environmental Health Scientist, John Hoggan, Environmental Health Scientist | Organization: Salt Lake County Health Department, **Environmental Health** Division 788 East Woodoak Lane (5380 South) Murray, UT 84107 |

**What is your overall impression (your general sentiment) of the work that was completed at the Davenport Flagstaff Superfund Site?** Salt Lake County Health said they haven't any issues at the Portland Cement cleanup site. Groundwater is monitored on site and coordination with permits on construction projects within the county continue to promote institutional controls. Salt Lake County Health has an active role with UDEQ and EPA implementing Institutional Controls (ICs) at Superfund cleanup sites throughout the County.

The Department has worked with UDEQ to develop a mapping system to identify cleanup areas with Environmental Covenants to track property records. With Salt Lake County Planning and Development services, the Health Department coordinates permit approval for property development based on where a property the lies within the overlay zone. If the property lies within the overlay zone, indicating potential impact from lead and arsenic contamination, the developer is required to submit a Sampling and Analysis plan for the County to review.

Are you aware of any community concerns regarding the Site or its operation and administration? **Salt Lake County Health is not aware of any health or environmental concerns reported at the 71-acre Portland Cement over the last five years. The department coordinates reported calls with UDEQ and has visibility with building permits processes and ordinances to monitor construction on cleanup properties.**

**Over the past five years, have there been any changes in land use or are you aware of potential future changes in land use?** No land use changes regarding the Portland Cement properties have occurred impacting the commercial/industrial zoning designation for the site.

Do you have any comments, suggestions, or recommendations regarding the site's management or operation (institutional controls)? **The Salt lake County Health staff said the County offices were restructured within the County and requires more effort to coordinate institutional controls at cleanup sites. For example Planning and Development Services overseeing business licenses, code enforcement, and permitting inspection may receive applications independent of Health Department review. This only becomes an issue with permitting properties at cleanup sites and if a property owner or developer doesn't research the property properly. The Salt Lake County Health said it would be good to go over processes, update maps and information with coordinating departments to stay on top of cleanup areas and requirements. The County Health staff requested any new information or resources UDEQ could provide would be welcomed.**

**Do you feel well informed about the site's activities and progress over the last five years?** Salt Lake County Health keeps in routine communication with UDEQ as site activities effort to keep informed on cleanup activities such as reviewing inspection reports and formal decision documents. Salt Lake County Health staff said any issues with cleanup areas, and health or environmental concerns, are coordinated with UDEQ and EPA. The Salt County Health Department worked well together on institutional Controls regarding Salt Lake City's Orange

Street Sewer Project which involved a portion of the Portland cement property. Permits and ordinances with easements to update the sewer line were coordinated with the Salt Lake City Public Utilities office and contractors from 2013-216.

Do you have any comments, suggestions, or recommendations regarding the site's management or operation (institutional controls)? **No additional comments other than scheduling future meetings with EPA and UDEQ to update ICs maps for Salt Lake County.**

# APPENDIX F – SITE INSPECTION

Site Inspection July 19, 2017
Inspectors: Thomas Daniels
Dave Allison

On July 19, 2017 UDEQ representatives conducted a site inspection of the Portland Cement Superfund Site. UDEQ walked through all three areas of the Site and inspected the remaining wells to ensure that there were accessible and functional. UDEQ observed ongoing development and construction activities at the West and Site 3 areas of the Site.

Development and construction on the West area of the Site consists of the subdividing of the West area into several different lots and the construction of a charter school, a Boiler Maker Training building and the construction of an office building for AAA Barricades. Wells PWEA, PWS and PWBA were in good condition and accessible. The area around PWS and PWBA had been graded and cleared. The area where PWU and PWKA are located had been paved over and was being used to store barricades.

An indoor soccer arena has been built on a portion of Site 2 and the western portion of the site has been graded and levelled. Wells P2FA, P2HA, and P2CA are accessible and in good repair, but difficult to find due to debris stockpiled around them. Wells P2GA, P2M and P2BA are easily accessible and in good repair. Well P2EA was removed or paved over sometime after the November 2015 sampling.

Site 3 is being developed as part of the Redwood Depot business complex. Access roads for both the Orange Street Sewer upgrade and for development of the Depot have been installed throughout the Site 3 area. Wells P3FA, P3DA, P3EA, and P3CC are easily accessible and in good repair. The location, design and construction of a concrete building foundation have incorporated wells the locations P3GB and P3O and ensue continued access.

No significant issues were identified at any time regarding the clean fill and vegetation at the Site. The vegetated cover has taken hold well and covers most the Site. In the areas where vegetation is not present, the clean fill remains protective of human health. The Site fencing has been torn down in places but is not considered a risk to human health since much of the Site is currently available for development and access is no longer restricted. Trespassing and illegal dumping appear to have increased since access roads have been built across the Site. No other items of concern were identified during the Site visit.

See attached photos:

## Photographic Log

| Inspection Date: | Five Year Review Site Inspection |
|---|---|
| July 19, 2017 | Portland Cement Superfund Site |

| Photo No. 1 | Date: 7/19/17 |
|---|---|

Well P3CC, looking east, Redwood Depot Development in background

| Photo No. 2 | Date: 7/19/17 |
|---|---|

Well P3CC, Looking north

| | |
|---|---|
| Photo No. 3 Date: 7/19/17<br>Well P3DA, looking east, Redwood Depot in background |  |
| Photo No. 4 Date: 7/19/17<br>Well P3FA, looking north |  |

| Photo No. 5 | Date: 7/19/17 |
|---|---|

Well P3GB incorporated into Redwood Depot building

| Photo No. 6 | Date: 7/19/17 |
|---|---|

Well P3O, incorporated into Redwood Depot building

| | |
|---|---|
| Photo No. 7 | Date: 7/19/17 |
| Well P3O, looking south. |  |

| | |
|---|---|
| Photo No. 8 | Date: 7/19/17 |
| Wallace Stanger charter school. |  |

| | |
|---|---|
| Photo No. 9 | Date: 7/19/17 |
| Wallace Stanger charter school. |  |

| | |
|---|---|
| Photo No. 10 | Date: 7/19/17 |
| Well PWEA |  |